Aspects of City's Fortification through Time:
The challenge of Fortifying Baghdad as a Case Study

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Abstract— *Since his very first steps to develop a shelter, the first thing that jumps to Man's mind is indeed how to fortify his own territory and protect it from the outside, intruders, and for sure enemies whether humans or animals. This paper illustrates the development of city's fortification through time and the transformations in its aspects that change according to the development of the attacking techniques. This issue is of great importance to the developing countries that suffer for long years from what is known as the modern warfare and terrorism afterward like Iraq. To be secured, therefore, is the major concern of Iraqi citizens, and since their cities are still treated with no clear fortification strategy or updated plan; this paper offers a quick overview on important old and contemporary global techniques that could provide people with the sense of security in their cities and communities. The paper will then discuss the challenge of fortification in Baghdad as an example of the cities that suffer a severe lack of security.*

Keywords— ***Fortification, Electronic Surveillance, Defensible Space, Gated Communities, Ring of Steel, Optical Urbanization, Baghdad.***

Fig. 1 The hole in Amiriyah Shelter's roof due to the U.S. aerial attack [3]

I. INTRODUCTION

In the dawn of 13th February 1991 during the Gulf-War, more than 300 Iraqi civilians (mostly women and children) were killed in a U.S. aerial attack that targeted an Iraqi air-raid shelter in Baghdad with two laser-guided smart bombs. Amiriyah shelter which was originally fortified against aerial and nuclear attacks seemed very safe to Iraqi citizens and government during the Iraqi-Persian (1980-88) and then Gulf (1991) wars' attacks [1, 2] until that dawn which faced the whole world with the hi-technology's new horror that changed the global look for the ordinary types of attacks and fortifications. (Fig.1) The aerial smart attacks aren't the only major challenge that faces Baghdad and other Iraqi cities; as since 9th April 2003 (the collapse of the former Iraqi regime) Baghdad faces a new even bigger challenge that threatens its citizens' lives on a daily basis represented by terrorists' suicide bombing attacks and looting everywhere. These facts urge the paper to adopt the issue of city's fortification and present some of its current trends vs. traditional ones in an attempt to highlight the possibilities to enhance the current situation of Baghdad city's fortification as an example for the suffering Iraqi cities. The paper discusses city's fortification as a spatial organization and as a technology.

II. FORTIFICATION: HISTORICAL BACKGROUND

Thousands of years ago, back to the Early-Dynastic Era ca. 3000B.C. most of the Sumerians' city-states and their Temene[1] were well fortified by city walls made of mud. Moreover, those cities used the nature's blessings like rivers, cliffs and hills to fortify their cities (Fig. 2); Sargon (the great) of Akkad; who was the first king that established a formal army, was famous of defeating those cities by destroying their fortified city walls using some kind of artificial cliffs or ramps that enabled them of escalating these walls as thought by archaeologists; he then ordered those cities to remove their walls to be easy controlled by him. Later on, Assyrians ca. 1000B.C who were well known by their high military experience used to have two main heavy fortified city cores (One for the King and the other for his successor) as well as the main city walls around them. Those cities used the hills for these cores or for the city as a whole, and were surrounded by water channels from the river as an extra fortification. (Fig. 3) Assyrians were famous of using tanks made of steel and horses in their wars, and they use such tanks with battering-rams as well as fire missiles in destroying the city walls of their enemies' cities, they also used ladders to escalate those walls in their attacks. [4] In England within the Bronze Age ca. 3000B.C. they maid moats around the walled settlements to unease the access to it and give the citizens an extra time to prepare their defence. Unlike many of the Mesopotamian cities, the European cities had used stone for their city walls. The Romans, who were the first in Western Europe that had a disciplined trained army, they used to build a fortified camp every night during their marching in their enemies' territory, where moats were excavated, walls were built, and palisades put up. And when they stayed for a longer period in the same location their temporary fortifications get reinforced and became permanent. Ca. AD800 the use of ring forts, and

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[1] Temene is the plural of Temenos which is a Greek word that refers to the religious centre of the city.

castles by the European kings started to be familiar in European cities. [5] But in the 14th century the first cannons appeared in battle field. Fortifications in the age of black powder evolved into much lower structures with greater use of ditches and earth ramparts that would absorb and disperse the energy of cannon fire. This placed a heavy emphasis on the geometry of the fortification to allow defensive cannonry interlocking fields of fire to cover all approaches to the lower and thus more vulnerable walls. [6] But this was far from enough. A number of inherent weak spots remained such as the many blind spots around a medieval fortification. In the mean time, in Italy, a new protection against cannon fire was developed. The first thing they did, they removed the blind spots in front of the towers, and these towers were given a triangular front that could be covered completely from the surrounding parts of defence wall; then a rectangular construction was put up against the basis of each triangular tower; so that everybody who dared to approach the wall could be hit. Then the triangular construction became pentagonal. The bastion was born. [5] (Fig. 4)

The arrival of explosive shells in the 19th century led to yet another stage in the evolution of fortification. Star forts of the cannon era did not fare well against the effects of high explosive and the intricate arrangements of bastions, flanking batteries and the carefully constructed lines of fire for the defending cannon could be rapidly disrupted by explosive shells. In response, military engineers evolved the polygonal style of fortification. The ditch became deep and vertically sided, cut directly into the native rock or soil, laid out as a series of straight lines creating the central fortified area that gives this style of fortification its name. The profile of the fort became very low indeed, surrounded outside the ditch by a gently sloping open area so as to eliminate possible cover for enemy forces, while the fort itself provided a minimal target for enemy fire. The entry-point became a sunken gatehouse in the inner face of the ditch, reached by a curving ramp that gave access to the gate via a rolling bridge that could be withdrawn into the gatehouse. Much of the fort moved underground, with deep passages and tunnels to connect the blockhouses and firing points in the ditch to the fort proper, with magazines and machine rooms deep under the surface. Steel-and-concrete fortifications were common during the 19th and early 20th centuries. [6] In 1945 during the World War II, the U.S. XIV Corps reported that their plan to capture Manila; the Japanese city, faced obstacles, and stated that the Japanese defence of Manila comprised a strongly held core. Their plan of defence was based on the Walled City as the inner stronghold. This core was surrounded by a rough semi-circular formation of public buildings, garrisoned and prepared for defence. To the rear were other strong points consisted of a series of well constructed pill boxes so placed as to utilize the protection afforded by existing obstacles, machine gun, anti-tank and rifle-fire. Mines, barricades were also used in defence. Their construction was the strongest as it was built to resist the earthquakes. But, after employing direct fire and heavy bombardment the guns succeeded in driving the defenders from the walls and opening breeches for the

attackers. [7] However, the advances in modern warfare since World War I have made large-scale fortifications obsolete in most situations. Only underground bunkers are still able to provide some protection in modern wars. [6]

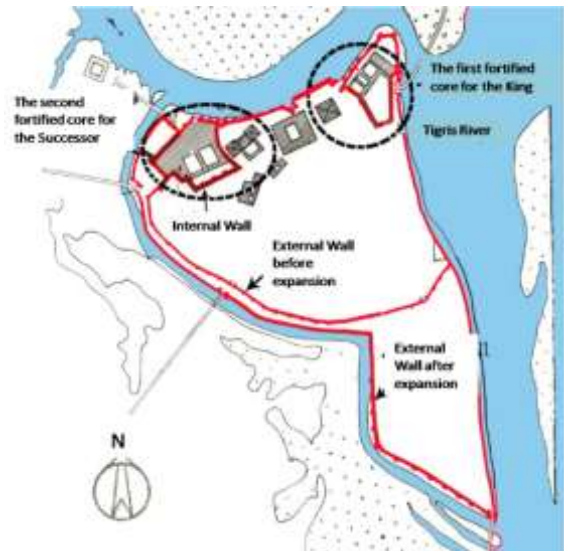*Fig. 2 Ur City in Mesopotamia during the Early Dynastic Era [8]*

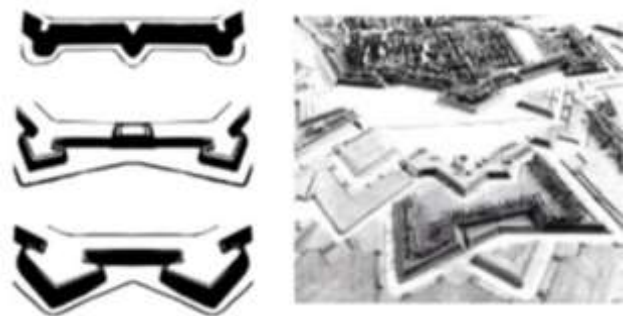*Fig. 3 Assure City in Mesopotamia during the Assyrian Era. [8]*

Fig. 4 The Evolution of Bastions in European city against Cannon fire. [5]

III. FORTIFICATION: CONTEMPORARY ASPECTS

Nowadays, as the world goes with the Information revolution and hi-technology advantages and disadvantages in every field of the daily life including warfare; the traditional old techniques of fortifications are not sufficient any more. The attack of Amiriyah shelter (mentioned above) with smart bombs was a good example of the developed attacking strategy that extremely defeated the old familiar type of city's fortifications. However, it is the famous terrorists' aerial attack that targeted the twin towers in U.S.A on 11th September 2001 that was an eye-opening on the new aspect of danger; precisely we can say; "the Unexpected Danger from the Unknown Destination". That is a new type of wars has developed within the end of the 20th century; the war of terrorism; which is unlike the old familiar type of wars, you don't know who exactly your enemy is; and which country or destination you are having the attacks from. In this war everyone in all countries could be a potential serious enemy. Moreover, there's no war-front, everywhere in any city could be easily targeted by such aerial attacks or suicide bombing attacks. Now, here in this serious critical situation, the information itself that made the enemy so ambiguous turned to be the new aspect of city's fortification in defence. Countries with advanced technology and political system have recognized clearly that to defend their cities, then they should secure their citizens' normal daily lives, and care not only of the formal borders but in every part in the city; they figured out that it's not a matter of spatial organization only, but should be accompanied with electronic surveillance. The followings are some of these solutions including what some researches put under Electronic Fortifications:

A. Defensible Space

In 1972, Oscar Newman for the first time wrote about the ability of spatial organization to reduce the rate of crimes in residential communities in what he calls Defensible Space. (Table 1) His concept was and still adopted by many architects and planners in designing residential communities. All Defensible Space programs have a common purpose: They restructure the physical layout of communities to allow residents to control the areas around their homes. This includes the streets and grounds outside their buildings and the lobbies and corridors within them. The programs help people preserve those areas in which they can realize their commonly held values and lifestyles. Defensible Space relies on self-help rather than on government intervention, and so it is not vulnerable to government's withdrawal of support. It depends on resident involvement to reduce crime and remove the presence of criminals. It has the ability to bring people of different incomes and race together in a mutually beneficial union. Newman found that the following factors affect family's claim to a territory and then their ability to control it successfully: [9]

1) **Number of families sharing the territory:** A family's claim to a territory diminishes proportionally as the number of families who share that claim increases. The larger the number of people who share a territory, the less they feel rights to it.

2) **Building type and the hierarchy of territory privacy:** Different building types create spaces outside the dwelling unit that affect residents' ability to control them. That is the case whether the unit is one among many in a high-rise building or sits by itself on the ground; and how the grouping of units in different types of building configurations creates indoor and outdoor "non-unit" spaces of different character. Newman groups buildings into three basic types: single-family houses; walk-ups; and high-rises. The first type with its sub-types (detached, semi-detached, and raw houses) provide more privacy and then more control of the territory as it belongs to only one family; while in the walk-ups (also called Garden Apartments-non-elevator buildings) one finds that a radical new element has been introduced that totally changes the character of both the inside and outside of the building, as there're circulation areas within the building that are common because they are shared by a few families. The number of families sharing these common areas depends on how the entrances, corridors, and stairs are distributed within the building. Then here, there would be less privacy and control than the single-family houses, but yet having semi private spaces that offer fair control to the families involved due to their limited number. Such type can be built at a density of 20-40 units per acre as they are 2 to 3 stories in height; the less density provides more privacy and control. The third type, the high-rise (elevator buildings); because of the large number of people sharing them, these interior areas can only be designated as semi-public or even public. Even the corridors on each floor are shared by for example 13 families and are accessible from 2 sets of stairs and 2 elevators that are very public; and that provide the lowest privacy and the no control for the spaces.

Table 1: the relation between the spatial organization and the crime rates [9]

Social and physical variables	Correlations with dependent variables			
	Indoor felony rate	Indoor robbery rate	Robbery rate	Felony rate
Percentage of population receiving welfare	(1) .51	(1) .46	(1) .47	(1) .54
Building height (number of units per entry)	(2) .36	(2) .36	(2) .36	(5) .22
Project size (number of apartments)	(3) .27	(3) .26	(3) .25	(3) .22
Percentage of families with female head on AFDC	(4) .44	(4) .41	(5) .36	
Number of publicly assisted projects in area	(5) .25	(5) .26	(4) .33	
Felony rate of surrounding community				(2) .41
Per capita disposable income				(4) .49

N.Y.C. Housing Authority police data for 1967: 87 housing projects. .01 level of significance at ± .27, .05 level of significance at ± .21.
*Numbers in parentheses indicate rank order of correlation in creating stepwise multiple regressions.

B. Gated Communities

Gated communities are fortified enclaves where the security of the residents is provided via electronic surveillance as well as boundary regulations that rise up the private security. As with gates and walls, electronic surveillance may

operate as a less visible but similarly political fortification of urban space. Surveillance can police residents as well as outsiders, all the while presenting durable barriers to social inclusion for marginalized groups within cities. However, the main concept of the Gated Community is the same as the Defensible Space theory by Oscar Newman. [10] Well, the deference between the defensible space and the new gated communities is that Newman's Defensible Space depends totally on the special organization, density, and size of projects to evoke the sense of belonging of the space in residents and lead them to control the space and protect it from intruders; [9] while the new gated communities depends on electronic surveillance as well to provide security. Monahan (2006) confirms that the residents of the gated communities possess relative mobility and minimal personal risk compared to those in public housing due to the electronic surveillance, as it provides both the enforcement to state's laws, and the enforcement of conformity in appearance and behaviour. But he criticizes it for mediating the social relations and co-constructing identities; he says that the residents feel subjected to undesired individual scrutiny and policing of their behaviours. [10]

Ramoroka and Tsheola (2014) find that the gated community model in Democratic South Africa modern urban settlements has privatized public spaces and created secluded settlements with fragmented delivery of public services such as security, policing, emergency services (fire tracks and ambulances) and a host for other municipal services (waste removal, water, and electricity meter readings); and in practice, this privatization creates controlled, restricted and prohibitive access to public spaces and amenities. But, they criticize this model and its application in the Democratic South of Africa because this model would perpetuate social and spatial fragmentation, displacement, distortion, incoherence, and inefficiencies, and sustain inequality in urban areas. Whereas the reverence for private profit guarantees a portion of the municipal revenue, the majority of the poor have not drawn benefits from this form of commodification, privatization, and marketization of their rightful property, state land. They find this model not sufficient for social transformation and integration. [11]

C. Ring of Steel

In 2014, Adrian Leppard the commissioner of Police for the city of London stated that the city of London continues to be among the safest places in the country to live, work, visit, and enjoy. He also reported that the crime has fallen for the 11th consecutive year. Due to what is known as the "Ring of Steel". [12] Back to 1993, the Ring of Steel was first used by UK to protect the city of London from the threat of terrorism after the Irish Republican Armey (IRA) had identified the Capital financial centre as a perfect target for their bombing campaign. The ring of steel lies alongside and intersects the ancient London wall that was built by the Romans. Instead of bricks and stone, this contemporary defence system uses CCTV cameras[2], sentry boxes, bollards, one-way system, and flower planting. The old streets patterns have been redrawn to create a new urban plan that is easy to police. Anonymous non-places are generated to discourage citizens from lingering. People and conventional activities are removed from streets, unwanted in a new world where surveillance is paramount. [13] (Fig. 5 & 6) The entrances to the city were reduced, "Rings of Plastic" were set up to funnel traffic through the city, and "Rings of Concrete" were set up to fortify landmark buildings such as the houses of Parliaments (which were later painted black to make them more pleasing to the public). These planning techniques have securitised deferent zones in London according to their risk factors. In North London, counterterrorism measures are displayed as aesthetic ornaments. Outside Emirates Stadium, large concrete letters spelling out "Arsenal" have been constructed and placed to prevent vehicle access and in turn have become a popular site for funs and tourists to photograph each other. [14] (Fig. 7)

Fig. 5: London Ring of Steel, Fleet St., sentry box and CCTV cameras. [13]

Fig. 6: London Ring of Steel, tree planting and road blockage. [13]

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[2] Using CCTV technology enables Facial recognition the most essential method for security; and reduces the stressful tasks of watching for known individuals entering the area and comparing them against existing knowledge of active criminals. [15]

The ring of steel led to a juxtaposition of landscapes of power with defence. As John Urry (2002) highlighted, the ring of steel provides a physical and symbolic separation between "wild" and "tame" zones, developing a powerful "City of Control". Urry finds that such situation is the state of exception; that is a result of war or national emergency. Coaffee shows that the ring of steel symbolically and functionally served to institutionalise further the separation of the city from its neighbours, through the physical imposition of advanced security measures and access restrictions. This formed a "landscape of defence", which provided a reliable background to everyday life through formal and informal defensive strategies enacted for a variety of social, economic, and political reasons. [16]

Fig. 7: Using letters to prevent the access of vehicle. [14]

D. Optical Urbanism

In his book "Hollow Land: Israel's Architecture of Occupation", Weizman (2007) discussed the fortification techniques for Israel's settlements in the West Bank since their emergence until the current time. Weizman described what he called "Optical Urbanism" as a current technique for such settlements that were built among the Palestinians' neighbourhoods during the Israeli-Arab ethnic conflict. Those settlements used to be isolated from the Arabs' neighbourhoods by being built on the hilltops and surrounded by city walls that took the same shape of the site topography. The main technique in what he called optical urbanism was actually; the locating of each residence windows, as those houses looking towards the centre of the city; their bedrooms windows should be oriented to that centre while the other living rooms windows should be oriented to the outward of the settlement. This type of organization is called by Israelis "*the Lookout- Settlements*" a term that indicates the primary function of settlements in mountain regions. Not only being at the top of the hills and mountains make such settlements visually in control of the whole area, but also the arrangements of homes and roads as rings around summits imposes on the dwellers an axial visibility oriented in two directions; out and down, toward the surrounding landscapes, and in and upwards, a gaze folded in on itself, overlooking the common public spaces and homes of the other members of the community. [17]

In this way this kind of organization could be also recognized as special kind of defensible space and gated communities.

IV. BAGHDAD: THE CHALLENGE OF FORTIFICATION

The first planned structure for the city of Baghdad was based on a city which was built in AD762, by the Abbasid Caliph Al-Mansur as a capital city of his Islamic Empire which was located in Iraq; this city was known as "*Dar As-Salam*" which means the Home of Peace; and also known as "The City of Al-Mansur". Like the city of Hatra and some other ancient Mesopotamian cities, it was rounded and heavily fortified. It was like a great fortress with four main big gates. The city was provided with two huge mud city-walls with an empty land in between for defence. The highest city wall (which was the inner wall) was about 30m height, and its thickness goes lesser as it goes higher until the smallest thickness in the top was about 12m, the wall had 113 towers. The lower wall (which was the external one) was about 17m height; its thickness in the base was about 17m. The city was surrounded by a wide deep moat filled with water. (Fig. 8) The Caliph's palace was in the centre of the city with an underground secret tunnel that connected it with the area outside the city to escape in case of danger. The round city of Al-Mansur was with a very limited size (only 531.4 hectares). In AD768, when his son Al-Mahdi came to the city with his army, the Caliph ordered him to camp with his army outside the city to the eastern part of it, and build the houses for the army with a city wall and a moat around it. This new extension was called Rasafa; it was also known as "The Camp of Al-Mahdi" and had its water from the Tigris River. In AD773 as the main city started to be crowded as a result of the growth of its trade, Al-Mansur, therefore, ordered that all the shops and workshops should be built out of the city, and he built a mosque for the merchants; the new extension was called Al-Karkh. That round city with Al-Rasafa and Al-Karkh composed the city of Baghdad. [18] (Fig. 9)
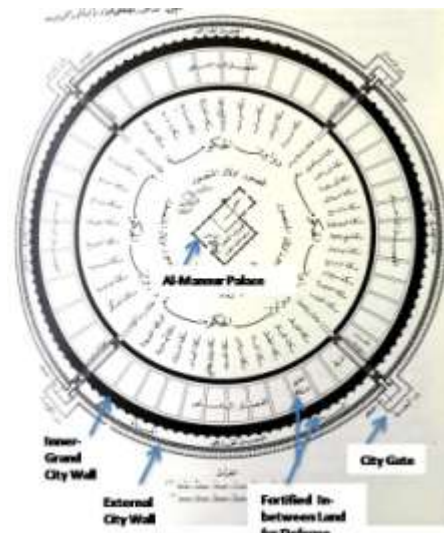

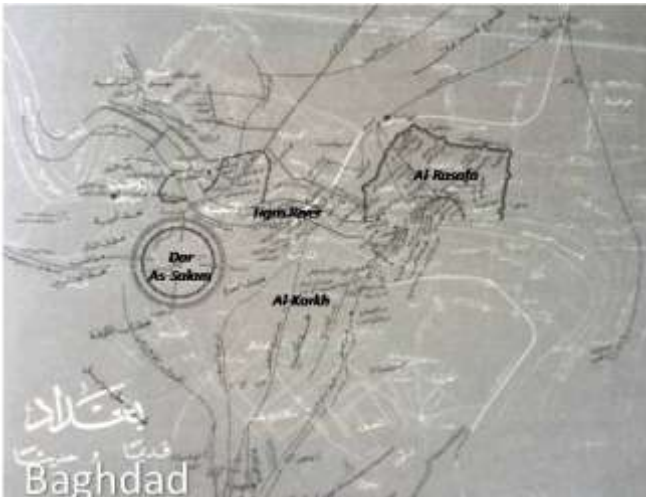Fig. 8: The round city of Al-Mansur: *Dar As-Salam*. [18]

Fig. 9: Old Baghdad: *Dar As-Salam*, Al-Rasafa and Al-Karkh. [18]

The Abbasid Caliphate gradually became so weak, in AD1094, during the reign of the Caliph Al-Mustadhir, construction began in building a wall around the city located on the Eastern bank of Tigris River. The wall was completed during the reign of the Caliph Al-Mustarshid (AD1118-AD1135), and was renovated in AD1229, which continued to exist until the later part of the 19th century. Despite repeated attempts for reforms by the late Abbasid Caliphs; the 13th century presented the greatest challenges for Baghdad and its history. The Mongols armies led by Hulagu, the grandson of Genghis Khan, reached the gates of Baghdad and took control of the city in AD1258. Through more than 300 years Baghdad was controlled by Jalayrids, and for a limited time by Turkmens, while the Safawids and Ottomans competed for a century to capture the city, until the Ottoman Sultan Murad IV conquered the city, but this time it stayed under the control of the Ottomans for approximately three centuries until the arrival of the British forces in AD1917. [19] (Fig. 10)

In 1869, Medhat Pasha became the *"Wali"* or provincial governor of Baghdad; the *Wali* destroyed the city's walls to build Al-Qishla building (fortress) as the government and military centre of the new Ottoman *"Wilayah"* or province. During the World War I, the British army occupied Baghdad in 1917, but the Iraqis had a big revolution against the British presence in 1920, then in 1921 was the creation of the Iraqi modern state, and Baghdad had become the capital of the Iraqi Kingdom under British Mandate; [19] then in 1958 the Republic of Iraq was established, and Baghdad continued to be the capital city.

In 1980, during the reign of the former Iraqi president Saddam Hussein, the Iraqi-Persian war took place and lasted for eight years, that conflict had greatly affected peoples' way of life, and resources, it also created social and political unrest in the country. [19] Many air-raid shelters were erected to secure the citizens. In 1991, Hussein's former regime changed its policy in fortifying the important places, as it used civilians' shields to protect the royal palaces, and other important zones, [2] the thing that couldn't quite prevent the attacks on those locations, but at least was affective to turn the world public opinion against the US severe unmerciful attacks.

Since the war of 2003, (the collapse of the former regime by US forces), the violence and bombings that the city of Baghdad endured affected the buildings and landmarks in the old quarters as well as the rest of the city. As a result, concrete walls were erected in the streets and around buildings everywhere, which drastically changed the overall urban scene in Baghdad. [19] (Fig. 11) It's not only those concrete walls, but also the wide streets of Baghdad had become a lot narrower because of the many checkpoints that you may even find in the same street, that make constant serious traffic jams in each single street of Baghdad. In spite of that, they couldn't prevent the bombings. Few months ago the Prime Minister Haider Al-Abadi ordered to lift some of those concrete walls and checkpoints, yet, many are still there.

The curfew (first imposed by the US military in 2003) was another fortification strategy that was forced on Baghdad for more than a decade in order to control violence by limiting movement at night ends (from midnight to 5:00am), but, unfortunately, had done little to curb the deadly bombings that plague the city. Few months ago Al-Abadi had also ordered to lift the curfew to make the city feel more liveable despite the violence. [20]

Fig. 10: Baghdad and its city wall during the Ottomans reign, AD1854. [18]

Fig. 11: Baghdad after 2003, concrete walls everywhere. [3]

The Green zone, the 10Km^2 area (home to the government buildings and foreign embassies) was closed and declared as no-go area for the public after the US-led invasion in 2003. [21] (Fig. 12) This international zone was commonly referred to as the "ultimate gated community" due to the numerous armed checkpoints, coils of razor wire, chain link fences, and it is surrounded by "T-walls" (reinforced and blast-proof concrete slabs). [22] It is claimed that this zone is the only safe place in Iraq right now.

Lately, as Baghdad has seen weeks of protests over poor services and abuses of power; Al-Abadi has allowed a very limited access to the Green Zone as a positive response to the public requests that demand the Iraqi politicians to feel the concerns and the fear of the Iraqi citizens and get out of their fortified walls. [21]

Fig. 12: Baghdad's heavily fortified Green Zone. [21]

The challenge of fortifying Baghdad has become the most important issue that needed to be discussed widely and given a try to solve. This paper highlights the first step towards such an urban discussion that search for an urban approach to a more secured city.

Why couldn't the concrete walls, the many checkpoints, and the curfew; that were experienced for more than a decade, provide security to the city of Baghdad the capital city of Iraq?!

The many checkpoints they actually caused more danger because they caused the crowd and traffic-jams that enable the suicide bombers of targeting more victims. Comparing this issue with what goes on in the Ring of Steel approach, the many checkpoints don't cause the crowd because they depend mainly on the electronic surveillance, so they keep the easy flow but have more controlling on it by depending on the limited width of the One-Way streets.

The use of the ugly concrete walls everywhere has a very negative impact on the citizens, they don't feel secured, but rather blocked from having a normal life, what makes it worst is the huge amount of dirt that use to be collected in many neighbourhoods in Baghdad near and by these walls. (Fig. 13) Moreover, the lack of surveillance over these walls makes them not sufficient to face the danger of the bombings.

Defensible Space approach and its varied applications like the Gated Communities, and Optical Urbanisms, in spite of their social disadvantages, but, they could provide the sense of

security to the citizens by both the spatial organization and electronic surveillance.

Actually, the ring of steel, defensible space, gated community and optical urbanism approaches all remind us of the very ancient fortifying technique of the Walled Mesopotamian City-States. This technique provides more control on the urban space if it was supported with the right type of surveillance. The old surveillance technique was achieved by using the high towers that spread along the city wall and enable monitoring the whole city easily; while the new technique of surveillance is by using the cameras along the wall to provide a more detailed and efficient monitoring to the city; and provide a good early alarm for any suspicious act within the city.

Some Iraqi artists try from time to time to enhance the look of their beloved city by painting the concrete walls and let them be more Man-friendly structures. (Fig. 14) In this context, the experience of London and especially North London (mentioned above) in enhancing the look of these concrete walls, and the use of planting trees and flowers, as well as other Man-friendly obstacles, is highly recommended.

Fig. 13: Baghdad: The negative impact of the concrete walls. [3]

Fig. 14: Baghdad: Iraqi artists try to enhance the look of concrete walls. [3]

V. CONCLUSIONS

The previous timeline of the main urban fortification techniques showed the importance of the spatial organization accompanied with surveillance; whether it was normal or electronic, in achieving security for the city and its citizens.

Natural and artificial obstacles like city walls, rivers, and mountains might seem no more sufficient, but the truth concluded from this study is that such old techniques in guarding the city; although can no more face efficiently the advanced attacks' weapons, but in the meantime will slow the enemy, rise up highly the cost of the attack; and in the meantime, give more time for the citizens to provide a proper defense. The case of Manila (mentioned above) is a good example of that.

Locating walls in an unplanned way within the city may have serious disadvantages like confusing the citizens, narrowing the streets and causing dangerous crowds.

The defensible space, gated communities and optical urbanism provide more control on the urban space, and then provide the sense of security to their residents. To avoid the social disadvantages for such communities, those communities could be dedicated to people with common profession, or interests, or more likely belong to the same institutions; and should be within a limited size (regarding the main principles of the defensible space). To enable the citizens with low incomes of having a place in such communities, the government could support them financially through the real-estate bank, and letting the payment for their residence be as reasonable installments. This could be also achieved by reducing the cost of constructing such communities by using the local materials, and providing the chance to those people to build their houses by their hands.

Enhancing the look of the urban fortifications means make good acceptance and impact on the citizens, and enable them to feel more comfortable with the existence of such means around. That makes the city be more livable, though the serious situation it may have.

Early alarm (resulted of electronic surveillance) and underground type of shelters could save more citizens' lives in case of aerial attacks.

Finally, it is good to remember that what makes the concrete walls and other types of fortifications used in Baghdad so sufficient for the Green Zone and not sufficient for the other parts of it, is actually the availability of the electronic surveillance in that Zone, and the lack of it in the other parts of the city.

REFERENCES

[1] BBC News Website. [Online] Available: http://.news.bbc.co.uk/onthisday/hi/dates/stories/february/13/newsid_2541000/2541107.stm

[2] White House Website, "Crafting Tragedy". [Online] Available: http://georgewbush-whitehouse.archives.gov/ogc/apparatus/crafting.html

[3] Google Images. [Online] Available: www.google.com

[4] Baqir, Taha, Introduction in the History of Ancient Civilizations: the brief history of Mesopotamia civilization, part one, 1st ed., London, UK, Al-warrak Publishing Ltd., 2009. (Written in Arabic)

[5] Walls and Gardens Group, All You Ever Wanted to Know about Fortifications but Never Asked, [Online] Available: http://en.calameo.com/read/00322514435fc106eb4f2

[6] Cristal Links Website. "Fortresses and Defense Walls". [Online] Available: www.crystalinks.com/Fortress.html

[7] XIV Corps, Japanese Defense of Cities as Exemplified by the Battle for Manila, report, published by A.C. of S., G-2 Headquarters, Sixth Armey, USA, Jul.1945.

[8] Qadifa, Malik S., "The Image of Iraqi Architecture before Islam", PhD Eng. Thesis, University of Baghdad, Baghdad, Iraq, 2006. (Written in Arabic)

[9] Newman, Oscar, Creating Defensible Space, US Department of Housing and Urban Development, Office of Policy Development and Research, USA, Apr.1996.

[10] Monahan, Torin, "Electronic Fortification in Phoenix: Surveillance Technologies and Social Regulation in Residential Communities", *Urban Affairs Review*, vol. 42, no. 2, pp. 169-192, Nov. 2006.

[11] Ramoroka, Tlou and Tsheola, Johannes, "Gated Communities and the privatization of public spaces in Urban South Africa: Democratic Social Integration or Exclusion?", *Journal of Geography and Regional Planning*, vol. 7, issue 4, pp. 58-68, Jun. 2014.

[12] City of London Police, Annual Report 2013-2014, UK, May 2014.

[13] Williams, Henrietta, "Rings of Steel", *Mas Context*, Surveillance Special issue, issue 22, pp.45-58, Summer 2014.

[14] Ivanov, Sandra, "Rings of Steel: How 9/11 Changed the Way Cities are Planned", Offiziere Website: Security Policy-Armed Forces- Media. [Online] Available: http://www.offiziere.ch/?p=15339

[15] Teja, P. Ravi, Abhishek, R.R.V.S.S., and Maninth, P. Ram, "Biometrics Human Face Recognition Techniques", *International Journal of Engineering Trends and Technology (IJETT),* vol.4, issue4, pp.953-956, April 2013.

[16] Coaffee, Jon, Terrorism, Risk and the Global City: Towards Urban Resilience, Ashgate, UK, 2009.

[17] Weizman, Eyal, Hollow Land: Israel's Architecture of Occupation, Verso, UK, 2007.

[18] Makiya, Mohammed, Mustafa, Jawad, Susa, Ahmed, and Ma'aruf, Naji, Baghdad, Alwarrak Publishing Ltd., UK, 2005. (Written in Arabic)

[19] Al Silq, Ghada Musa Rzouqki, City of Stories, Iraqi Cultural Support Association, Iraq, 2011.

[20] Aljazeera Website. "Iraq Lifts Years-Old Curfew in Baghdad". [Online] Available: http://www.aljazeera.com/news/2015/02/iraq-curfew-baghdad-150207215227007.html

[21] BBC Website. "Baghdad's Heavily-Fortified Green Zone Opens to Public". [Online] Available: http://www.bbc.com/news/world-middle-east-34439899

[22] Global Security Website. "Green Zone". [Online] Available: http://www.globalsecurity.org