Dense Urban Environments: What Does the Operational Environment Look Like?

A Monograph

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Division and corps level organizations will face challenges in future urban environments that are similar to urban operations of the past. The migration of world populations into urban areas increases the government requirements to provide infrastructure and plan the growth of cities for increased populations. The interconnected nature and size of dense urban areas (DUA) will compound the complexity of the urban environment while competing with an adversary. During Large-Scale Combat Operations (LSCO), division and corps should consider new models and frameworks to support major combat operations and the transition to stability operations that will reduce the impact on the functioning of Dense Urban Environments (DUE) or Megacity.

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Abstract

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Division and Corps level organizations will face challenges in future urban environments that are similar to urban operations of the past. The migration of world populations into urban areas increase to government requirements to provide infrastructure and plan the growth of cities for increased populations. The interconnected nature and size of dense urban areas (DUA) will compound the complexity of the urban environment while competing with an adversary. During Large Scale Combat Operations (LSCO), Divisions and Corps should consider new models and frameworks to support major combat operations and the transition to stability operations that will reduce the impact on the functioning of a Dense Urban Environment (DUE) or Megacity.

Contents

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Acronyms

I MEF	1st Marine Expeditionary Force
ATP	Army Techniques Publication
BIAP	Baghdad International Airport
CENTCOM	Central Command
CFLCC	Combined Forces Land Component Command
CPA	Coalition Provisional Authority
DIV ARTY	Division Artillery
DPRK	Democratic People's Republic
DUA	Dense Urban Area
DUE	Dense Urban Environment
FM	Field Manual
ID	Infantry Division
LOC	Line of Communication
LSCO	Large-Scale Combat Operations
MAR DIV	Marine Division
NKPA	North Korean People's Army
OHRA	Office of Reconstruction and Humanitarian Assistance
OPLAN	Operation Plan
RCT	Regimental Combat Team
ROK	Republic of Korea
UN	United Nations
US	United States
USAID	United States Agency for International Development
USFEC	United States Far East Command

Illustrations

Tables

Introduction

This monograph identifies and describes necessary US Army division-level planning considerations for operations conducted within dense urban environments (DUE). The study will show that these planning considerations remain relevant independent of the temporal and spatial aspects of the urban operation.

The US Army remains engaged in conflicts around the globe, including Afghanistan, Iraq, and Syria and the urban environment is part of the operational environment in each of these engagements. More importantly, this type of fighting is not unique in the US Army's long operational history. Fighting within urban areas occurred during America's Revolutionary War, the Mexican-American War (1846-1848), World War II, the Korean War, and in Vietnam.[1] The US Army most recently updated its doctrine for urban operations in 2017, publishing *Army Techniques Publication (ATP) 3-06, Urban Operations* eleven years after *Field Manual (FM) 3-06, Urban Operations*, was last updated. The 2006 manual, which replaced a 2003 publication by the same name, included vignettes and updated information that incorporated the experiences of the previous three years of fighting in Iraq.

The 2017 *Urban Operations* publication, though built on those previous works, lacks information about larger urban environments that are increasing around the world, areas known as megacities and dense urban environments (DUE).[2] That is not to say that there is no guiding literature on operating in these highly urbanized and densely populated environments. Absent supporting doctrine, there exist numerous articles and reports in professional publications on DUE and megacities, and the Department of Defense (DOD) has been exploring ways to address

[1] Urban operations occurred in New York City in 1776, Mexico City in 1847, Hue, Aachen, Germany in 1945, Seoul, Republic of Korea in 1950, and Vietnam in 1969.

[2] Areas with population densities higher than 1000 persons per square mile are considered "dense" by the UN. Dense cities exceeding a population of five-hundred thousand are considered dense urban environments by this study, while those exceeding a population of ten million are widely considered megacities within the literature.

potential military dilemmas concerning DUE and megacities. This demonstrates a focus on and relevance of concerns associated with the conduct of operations in densely populated, urbanized terrain.[3]

As of 2018, urbanized areas account for 55 percent of the globe's population distribution.[4] Because of this increasing urbanization, future corps and division staffs should understand the implications of planning and operating within these environments. The 2017 edition of *Urban Operations* states that military units should only fight in urban terrain if necessary; the choice should rest on whether the operation will provide an advantage and if not, doing so threatens the larger campaign.[5] However, as military operations in 1950 on the Korean Peninsula and in 2003 in Iraq have shown, fighting in urban terrain is often unavoidable. These two examples involved fighting in the respective nation's capital city to achieve operational objectives and strategic ends. The global migration of populations into urban areas may make it necessary to fight in DUE, if not during decisive large-scale combat operations (LSCO) then

[3] Marc Harris, Robert Dixon, Nicholas Melin, Daniel Hendrex, Richard Russo, and Michael Bail, *Megacities and the United States Army Preparing for a Complex and Uncertain Future* (Arlington, VA: Office of the Chief of Staff of the Army, Strategic Studies Group, 2014), accessed August 15, 2018, https://www.army.mil/e2/c/downloads/351235.pdf; Dawn Morrison, Colin Wood, Timothy Perkins, and Carey Baxter, "Extreme Environment Basing Contingency Basing in Dense Urban and Megacity Environments" (Report, US Army Engineer Research and Development Center, Construction Engineering Research Laboratory, Champaign, IL, 2016), accessed August 18, 2018, https://apps.dtic.mil/dtic/tr/fulltext/u2/1028121.pdf; David N. Farrell and Megan Ward, *US Army TRADOC G-2, Mad Scientist Megacities and Dense Urban Areas Initiative: Data Collection and Analysis* (Hampton, VA: Mitre Corporation, 2016), accessed August 19, 2018, https://www.mitre.org/sites/default/files /publications/16-2955-tradoc-g-2-mad-scientists-megacities-analysis.pdf; US Army Subterranean and Dense Urban Environment Material Developer community of Practice included in the article by Todd South, "The Army and Marine Corps are Looking at What Troops Will Need to Fight in Megacities Underground," *Army Times,* January 9, 2019, accessed March 11, 2019, https://www.armytimes.com /news/your-army/2019/01/09/the-army-and-marine-corps-are-looking-at-what-troops-will-need-to-fight-in-megacities-underground.

[4] United Nations, Department of Economic and Social Affairs, Population Division, *The Speed of Urbanization around the World* (New York: United Nations, December 2018), 1, accessed April 23, 2019, https://population.un.org/wup/Publications/Files/WUP2018-PopFacts_2018-1.pdf.

[5] US Department of the Army, *Army Techniques Publication (ATP) 3-06, Urban Operations* (Washington, DC: Government Printing Office, 2017), 2-2.

certainly during the stability operations that typically follow, or potentially, during both operational phases simultaneously.

In 2017, the US Army shifted focus from brigade combat teams to the division as the primary unit of action.[6] Division staffs, responsible for planning across the range of military operations, possess the skills to plan operations but lack the experience associated with planning and executing LSCO.[7] Across the DOD, these planning skills have atrophied because of the prolonged conflicts noted earlier and the focus on decentralized operations at lower echelons. Further, staffs at the division level and above are unable to plan and train for LSCO beyond a warfighter exercise. The Mission Command Training Program facilitates and conducts warfighter exercises for division, corps, and Army Service Component Command staff to exercise their ability to plan and control subordinate units in a simulated environment.[8] Division and corps staffs necessarily augment their warfighter experience with lessons learned while conducting humanitarian aid missions, counter-terrorism and counter-insurgency operations in Afghanistan and Iraq, and operations that involve leading or supporting a coalition effort. The lessons learned from these non-LSCO missions can and should be considered when planning future large-scale combat within urban areas.

The physical environment of dense urban terrain is only one of many different environments in the land domain that a US Army division might operate in during future conflicts. Each natural or manmade environment presents its own unique challenges. DUE,

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[6] US Department of the Army, *Field Manual (FM) 3-0, Operations* (Washington, DC: Government Printing Office, 2017), 1-15, 1-1.

[7] US Army, *FM 3-0* (2017), 1-1. The range of military operations consists of types of activities conducted by the US Army or joint community in response to adversary actions. These actions are on-going during times of peace to ensure a competitive advantage during future conflict and can escalate in size and intensity from military engagement to limited contingency operations up to large scale combat operations.

[8] US Army Combined Arms Center, "Mission Command Training Program" (MCTP Overview Briefing, October 9, 2018), accessed March 30, 2019, https://usacac.army.mil/sites/default /files/documents/cact/mctp/MCTP_Overview_9_OCT_18.pdf.

however, compound multiple conceivable challenges due to the sheer number of the inhabitants, density of infrastructure, and complex, surface, super-surface, and possibly unmapped sub-surface infrastructure. Historical analysis of military operations in urban terrain during past conflicts illustrates the complexity and risks associated with these operations. However, the complexity and risk associated with these past urban operations cannot compare to the magnitude and complexity of DUE. Regardless, the lessons learned from past urban operations are relevant to future division staffs preparing for future LSCO. The US Army should consider the impact of dense urban environments and megacities during the execution of large-scale combat operations.

To glean potential lessons from past urban operations, this study compares and contrasts two historical case studies—operations in and around Seoul during the early months of the Korean War and Baghdad during the early stages of Operation Iraqi Freedom. Using the US Army/Joint urban triad and urban functional area analytic models, the monograph identifies a diverse selection of physical objectives associated with enemy, friendly, and neutral populations that potentially impact LSCO during decisive combat operations and beyond. This approach offers alternate objectives beyond the traditional enemy population and terrain-based objectives to support operations on an expanded timeline.

This monograph also includes a section on the complexity of dense urban environments. This section uses both doctrinal and non-doctrinal frameworks. The doctrinal frameworks are from *Joint Publication (JP) 3-06, Joint Urban Operations*, and the Army's 2017 *Urban Operations* publication. The research and analysis contained herein may lead to changes in future planning to support military operations across the conflict continuum with greater continuity, including updating the egregiously over-simplified urban triad, which describes urban terrain as consisting of complex man-made physical terrain; supporting infrastructure; and population size and density, but provides no detail on how these parts interact.

The first of the two case studies focuses on urban fighting in and around Seoul, Republic of Korea (ROK) during the Korean War, with particular focus on the early phases of the fighting

beginning with the Inchon landing in September 1950. The Tenth US Corps (X Corps) planned for two division-sized elements to seize the city of Seoul and to conduct a link-up with the 1st Cavalry Division (1 CD) that was fighting north from the Pusan Perimeter. The research and analytic focus of this case study is both the 1st Marine Division (1 MAR DIV) and 7th Infantry Division's (7 ID) planning and actions after landing on Inchon until the division link-up with 1 CD. A significant number of vignettes from 1 MAR DIV are included because 7 ID often conducted shaping operations or oriented on alternate objectives before entering the city.

The second case study focuses on the 3rd Infantry Division's (3 ID) attack to isolate Baghdad in 2003. The 3 ID fought conventional and unconventional forces as it moved north from Kuwait to reach Baghdad. The original V Corps plan to encircle Baghdad with vehicular forces included the 3 ID and the 1 MAR DIV. V Corps adjusted its plan because of the unexpected successes of its subordinate units. 1st Brigade of 3 ID (1/3 ID) seized Baghdad Airport while 2/3 ID penetrated the Iraqi defenses in Baghdad and seized operational key terrain in the center of a DUE. 3/3 ID maneuvered to the northwest and seized infrastructure to block the escape of Iraqi forces. Major combat operations ended shortly afterward and a transition to stability operations began. However, the residents of Baghdad began to tear the city apart. This led the US military into a fight it did not anticipate. Vignettes from other US military units in Baghdad will provide additional examples of the complexity of the urban conflict. Combined Forces Land Component Command (CFLCC) and higher decisions and authorities are included, as needed, to shape 3 ID's operations.

Though neither Seoul nor Baghdad were megacities at the time of these conflicts, both situations illustrate key features of a DUE that are worthy of study when considering military operations in urban terrain. This research supplies context for future division and corps planning in DUE. The research for both case studies focuses on unit orders and reports, unit war diaries, and other literary sources.

Dense Urban Environments and Doctrine

> Urbanization is complex, multifaceted process influenced by many factors including a nation's cultural development, its economic resources, and its industrial capacity.
>
> — US Department of the Army, *Field Manual (FM) 90-10, Military Operations on Urban Terrain (MOUT)*

As the world population continues to migrate toward urban areas, existing urban areas will become denser and larger. Today's dense urban environment will not necessarily be larger than cities from previous conflicts. However, the density of the population and the population's ability to communicate its plight through use of the internet is vastly different than past conflicts. So, while the Army has participated in battles in urban environments from Washington's defense of New York in September of 1776 through the liberation of Mosul from 2016 to 2017, the world did not watch the city of New York burn in 1776, but the world did, because of the Internet, see the devastating impact of war on Mosul, Iraq in 2017.[9] Baghdad, a city with a population of five to seven million in 2003, remains the largest city in which the military has conducted operations.[10] Urban environments become more complex as they grow, adapt with technology and changing economies, and become more reliant on infrastructure to maintain the flow of daily life.

Before delving into the dynamics associated with dense urban environments, it is important to clarify a few terms. The United Nations (UN) defines an **urban area** as a city with a population of at least 1,000 people per square mile.[11] A **city** is a geographic location based on urban population and defined by either the administrative boundaries or the urban agglomeration

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[9] David Fischer, *Washington's Crossing* (New York: Oxford Press, 2004), 100-107; Arnold and Fiore, "Five Operational Lessons from the Battle of Mosul," 64-65. A fire destroyed 600 buildings in New York as the Continental Army retreated.

[10] Joel Rayburn and Frank Sobchak, with Jeanne F. Godfroy, Matthew D. Morton, James S. Powell, Matthew M. Zais, *The US Army in the Iraq War Volume 1* (Carlisle Barracks, PA: Army War College Press, 2019), 149, 214, accessed March 13, 2019, https://publications.armywarcollege.edu /pubs/3667.pdf. This collection included a range of 5.6-7 million depending on the text.

[11] Dawn A. Morrison and Colin Wood, "Megacities and Dense Urban Environments: Obstacle or Opportunity?" *Small Wars Journal* (February 23, 2016), accessed August 18, 2018, http://smallwarsjournal.com/jrnl/art/megacities-and-dense-urban-environments-obstacle-or-opportunity.

around the city proper.[12] The **urban agglomeration** is the collection of multiple urban areas that grow into one another—for instance, today's Greater Seoul Metropolitan Area, is home to over 24 million residents (of whom only 11 million reside within the Seoul city limits), includes 31 cities, and encompasses more than 1060 square miles, giving it a population density of almost 23,000 people per square mile.[13] The areas further out become the metropolitan area but may not be completely urban. To understand the hierarchy of these different definitions, figure 1 provides a visual representation of the administration and hierarchy by size.

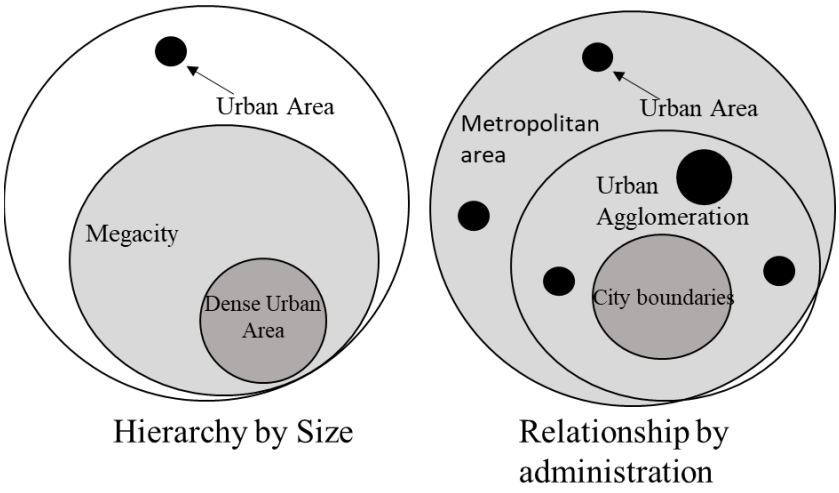

Figure 1. Understanding Urban Areas and Hierarchy. Created by author.

The US Army does not provide a formal definition for a megacity but the UN defines **megacities** as urban environments with ten million people or more.[14] Currently, there are thirty-three megacities and 548 other cities with a population of at least one million.[15] A UN report found population migration from rural to urban environments occurring worldwide, which

[12] United Nations, Department of Economic and Social Affairs and Population Division, *The World's Cities in 2018–Data Booklet* (New York: United Nations, 2018), 1, accessed March 11, 2019, http://www.un.org/en/events/citiesday/assets/pdf/the_worlds_cities_in_2018_data_booklet.pdf.

[13] Demographia, *Demographia World Urban Areas*, 15th ed. (April 2019), accessed May 12, 2019, http://www.demographia.com/db-worldua.pdf. 9, 23.

[14] United Nations, *The World's Cities in 2018–Data Booklet*, 3.

[15] United Nations, *The World's Cities in 2018*.

suggests that the number of megacities will continue to grow.[16] This increase in population in cities may over-stress infrastructure: transportation; food; energy; potable water; and employment (commerce). In the future when the US Army conducts operations in or near a megacity, it may need to simultaneously assess, repair, or augment the existing infrastructure to accomplish the military end state.

The term dense urban environment has no standardized definition and is not found in Army or Joint doctrine. Large urban areas smaller than 10 million in population can still present a significant challenge to military operations. The demographics journal site *Demographia* uses a threshold of 500,000 for their tracking of the most densely populated areas on the globe. [17] This paper will use this same 500,000 population threshold to define dense urban environments. Thus, **dense urban environments** can be said to include all high population urban areas with a population density of more than 1,000 persons per square mile and a population of more than 500,000, to include megacities. Understanding the urban environment is important to urban conflicts of the future, regardless of whether the population is above the megacity threshold. Importantly, DUE population consists of both permanent residents *and commuters* within the administrative city boundaries or within the urban areas around it.[18] The purpose of adding the commuter population and defined boundaries is for inclusion of various types of cities. Commuter cities may have a massive population during opposing periods. Cities that have a sprawling urban area of different municipalities, but together create a larger metropolitan area, also qualify as a

[16] United Nations, *The Speed of Urbanization around the World*.

[17] Demographia, *Demographia World Urban Areas*, 9, 22, 23. The publication lists more than one thousand cities worldwide that meet the criteria of a dense urban environment as described in this monograph.

[18] Author's definition. For an alternate definition on DUE, see Thomas Arnold and Nicolas Fiore, "Five Operational Lessons from the Battle of Mosul," *Military Review* (January-February 2019): 59. A DUE is defined as the Physical and contextual environment characterized by human-centric complexity and change.

DUE. Dense Urban Area is a similar term used by some researchers, but neither is defined in joint or Army doctrine.

"Focus on the essential" is a tag-line from previous military doctrine and the concept continues today in *ATP 3-06 Urban Operations* under the heading, "Considerations for Urban Offense."[19] According to doctrine, that which is essential, referred to in doctrine as the decisive point, leads to success in war.[20] Though doctrine does not define the decisive point as only the enemy military, it is evident from historical analysis that a bias exists in the US Army to focus the enemy military. An operation in a DUE challenges this bias. A commander and staff should consider non-enemy related objectives to support the long-term military end state. US military planners may not consider these objectives decisive to achieve military success across the conflict continuum. As operations in Baghdad demonstrate, these non-enemy military related objectives are critical during stability operations, or within the support area.[21]

Functional areas, infrastructure, and unique population dynamics continue to exist in all cities, but the geographic sprawl and interconnectedness of dense urban environments increase the impact and magnitude of ignoring or misunderstanding the system of systems that exists in these cities. Considering the complexity of maintaining something as fundamental as basic human services in these cities illustrates this point. Where infrastructure is located in a DUE is based on the growth and development of the city. *Urban Operations* subdivides the physical aspects of urban areas into seven functional areas. They include: core; core-periphery; commercial ribbon; residential areas; industrial areas; outlying high-rise areas; and military facilities.[22] Staffs at all

[19] US Army, *ATP 3-06* (2017).

[20] US Army, *ATP 3-06* (2017), 4-11. For a definition of decisive point, see US Department of the Army, *Army Doctrinal Reference Publication (ADRP) 1-02, Terms and Military Symbols* (Washington, DC: Government Print Office, 2015), 1-24.

[21] For a definition of support area, see US Army, *ADRP 1-02* (2015), 1-80.

[22] US Department of the Army, *Field Manual (FM) 3-06, Urban Operations* (Washington, DC: Government Printing Office, 2006), 2-8 – 2-12.

echelons use the framework to physically subdivide an urban area and omit areas that do not pertain to a specific DUE. Additional considerations from *Urban Operations* include both physical and non-physical *urban infrastructure categories*: transportation and distribution networks; administrative and human services; and economics and commerce.[23]

Some governments, recognizing their own complex and vulnerable systems, plan into their environment redundant sustainment systems that can manage anticipated system strain due to population growth. However, a military or violent extremist organization can perpetuate violence that will strain these systems in an urban environment beyond the redundancies developed by city planners and administrators. The addition of subcategories in *ATP 3-06* has improved the urban triad and enables better analysis (see table 1). Army doctrine over-simplifies the complexity of megacities and DUE through its use of the urban triad, which provides little more than a snapshot of the either the system of systems or the complexity present in megacities and DUE.

Table 1. Categorization of Urban Triad

Categorizing the Urban Triad from ATP 3-06 (2017)/ JP 3-06 (2009)		
Complex Man-made Physical Terrain	Supporting Infrastructure	Population Size and Density
Functional zones	Electrical	city size
Street patterns	water	demographics
-road networks	waste water	concentration
-bridges, tunnels	transportation	disposition toward forces
sub-terrainean	air (trans)	internal dispositions
physical representation of infrastructure	ground (trans)	Flow (internal)
	waterway (trans)	Flow (external)
buildings- independent of purpose	Foot	resident vs commuter
	public (trans)	
City patterns	human services	
	Administration service	
	Communications	
	Information	

Source: US Department of the Army*, Army Techniques Publication (ATP) 3-06, Urban Operations* (Washington, DC: Government Printing Office, 2017), 1-3; US Department of Defense, Joint Staff, *Joint Publication (JP) 3-06, Urban Operations* (Washington, DC: Government Printing Office, 2009), I-2.

[23] US Army, *ATP 3-06* (2017)*,* 1-20, 1-21.

Doctrine encourages staffs to consider the variables presented in the triad, but without pre-existing knowledge the resulting analysis will likely be lacking because the relationship between these variables is not explained.

Dense Urban Environments

Though the presence of people on the battlefield complicates operations for military planners and combatants, it is important to understand dense urban environments beyond their population number or physical size. Instead, DUE should be seen as a system of systems, which can then be examined through multiple, complementary frameworks. The need for a blend of different frameworks to fully understand the DUE demonstrates the complexity of the inter-related factors associated with dense urban environments.

The physical environment of a dense urban environment is comparable to any major city worldwide. The area or footprint of a city describes the size of a city but lacks further description of the environment. Still, the physical layout of a city can often be traced to the purpose, function, and modern influences on the city structure, though some emerge more haphazardly. Most littoral cities originally focused on trade based on a regional commodity. Cities positioned on rivers were typically founded to use waterways as one means of moving goods when roads were insufficient for travel. Cities which expanded during industrialization began with large factories which drew power from water or other sources of energy like steam, coal, and eventually electricity. The UN found a correlation between city size and an increase in infrastructure, but a decrease in control of the growth. As cities grow, residential areas expand outside of the control of governments.[24] The UN study demonstrates issues in large DUE and how the infrastructure may not be able to support the population prior to US forces arriving.

[24] United Nations, *The Challenge of Slums-Global Report on Human Settlements 2003* (London: Earthscan Publications, 2003), accessed March 24, 2019, https://www.un.org/ruleoflaw/files /Challenge%20of%20Slums.pdf, 25. Results of this study were not universal, growth in some cities was regulated however general trends showed growth that could not be monitored for government services.

In a DUE, the population creates the flow unique to that city.[25] Factors that affect this flow before US military operations include; number of residents and commuters, specific transportation infrastructure, and commercial traffic. During conflict the flow changes, much like water takes the path of least resistance, although humans sometimes move in error and move directly into competing forces. External traffic coming into the city like commuters and commercial goods influence the internal flow of the city based on street patterns within the city. The flow of a city is determined by many factors dispersed across the urban area and outside.

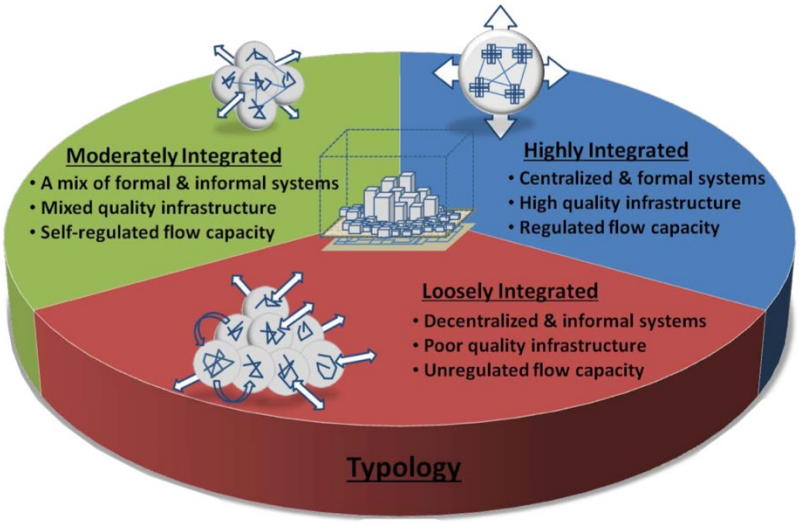

Figure 2. Framework of Megacity Integration. Marc Harris, Robert Dixon, Nicholas Melin, Daniel Hendrex, Richard Russo, and Michael Bail, *Megacities and the United States Army: Preparing for a Complex and Uncertain Future* (Arlington, VA: Office of the Chief of Staff of the Army, Strategic Studies Group, 2014), 14, accessed August 15, 2018, https://www.army.mil /e2/c/downloads/351235.pdf.

A DUE requires government assistance to control the flow in the city. The US Army Strategic Studies Group paper, *Megacities and the United States Army: Preparing for a Complex and Uncertain Future,* was one of the first internal analysis by the US Army of a local government's ability to control a megacity. This paper identified a factor of city *integration* as a

[25] General Stephen Townsend, "Multi-Domain Battle in Megacities" (Video lecture, TRADOC G2 Conference, April 3, 2018), posted April 12, 2018, accessed November 24, 2018, https://www.youtube.com /watch?v=ARz0l_evGAE.

model for the flow in a city (see figure 2). These integration categories—highly integrated, moderately integrated, and loosely integrated—describe the interaction between the government's systems, infrastructure, and flow of goods, people, and information.[26] The integration of a city depends on government control of growth and development.

Using the above framework, one can analyze the integration of a city based on the government's ability to govern. The system can work vertically and horizontally to be highly interconnected. Within a DUE with a metropolitan area of local governments, clearly defined laws are required for each level to control aspects of flow and infrastructure. Highly integrated systems in this model demonstrate a functioning hierarchical governments' ability to control flow and manage infrastructure. The control and regulation of growth permits the infrastructure to keep up with the expansion of the city. Moderate integration may include lesser forms of any number of components which results in less integration and less ability to control one or more aspects. Moderately integrated systems contain informal governing bodies which may make decisions on subsections of the urban environment. Loosely integrated systems may not have the accountability systems to regulate growth and may thus have compounding problems in its structure and regulation. If a government cannot control city growth, infrastructure, or its integration then the system may lack legitimacy. Ultimately, the legitimacy of the system reduces if the government cannot control itself or the categories of integration.[27] DUE are vulnerable due to size and the influences which can slowly or rapidly diminish the flow and integration of a city. Thus, the US Army can use these categories to understand the complex physical terrain and infrastructure systems that support it.

[26] Harris et al., *Megacities and The United States Army Preparing for A Complex and Uncertain Future*, 14-15.

[27] Harris et al., *Megacities and The United States Army Preparing for A Complex and Uncertain Future*, 14-15.

Urban Infrastructure Categories

To maintain the flow of a city, the government manages its internal systems to ensure infrastructure provides for current and long-term requirements. The US Army views urban infrastructure through categories that are separated into physical and non-physical systems. It is complex due to the number of relationships and levels of interconnectivity within the overall system, but these multiple interworking relationships are essential to maintain the flow. The urban government, part of administrative services, manages and is part of the system. Complex physical terrain, infrastructure, and population create the flow of a city that adapts with changes. The urban infrastructure categories found in *Urban Operations* attempts to show how these independent systems can connect to create functioning urban environments, (see figure 3). Every city needs not every component; many cities function with intermittent power or without sub-components of infrastructure.[28]

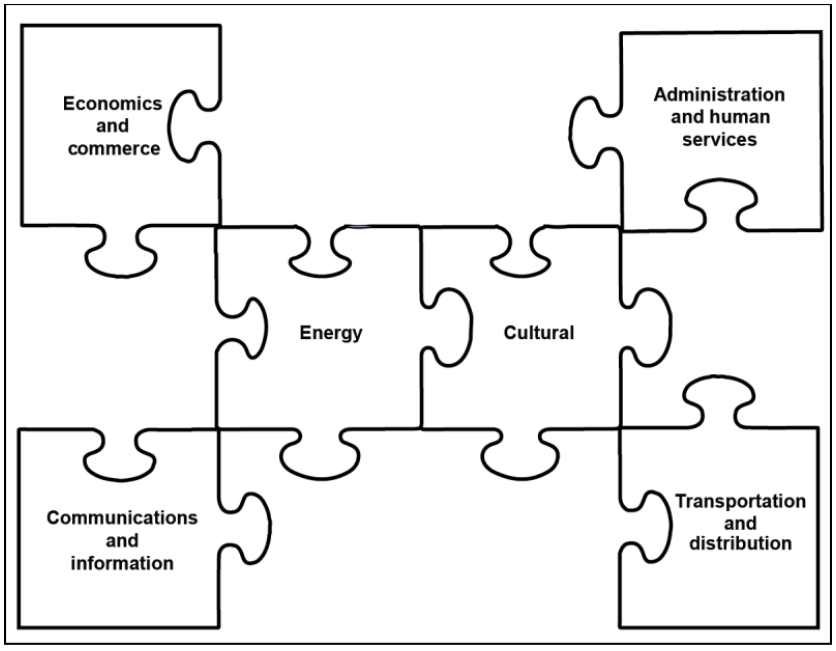

Figure 3. Urban Infrastructure Categories. US Department of the Army, *Army Techniques Publication (ATP) 3-06, Urban Operations* (Washington, DC: Government Printing Office, 2017), 1-19.

[28] US Army, *Army ATP 3-06* (2017), 1-17 – 1-23.

To address flow, one should understand the transportation services and the complex man-made physical terrain that supports the infrastructure. Transportation and distribution systems, in a DUE impact day to day operations as well as military operations. Sprawling hundreds of square miles, networks of roads, railroads, waterways, and bridges are important to residents in the city but present challenges to military operations. The networks of road, city rails, and train tracks support the commercial and residential traffic and are not intended to support a large military operation oriented in single or multiple directions. Transportation services are vulnerable to military action. Train cars and engines are susceptible to damage, destroyed tracks can stop service. Airlines may move aircraft or cease flights in and out of airports. Ships may similarly avoid ports during a conflict in a DUE near water. Military operations in or near DUE can have these additional affects internal and external to the DUE.

Public or private utilities represent a collection of infrastructure services provided to the residents of a city. Though public utilities do not seem to be a direct route to military objectives, it may be decisive in follow on phases which require a return or increase of previous standards in order to maintain the existing flow in a DUE. A city with sprawling metropolitan area will need multiple types of utilities to maintain life. Depending on the quality of life; energy production and distribution, water (storage, purification, and treatment), gas distribution, and waste water removal is susceptible to military tactics and ordinance. Thus, even though service infrastructure is not an enemy-focused objective, it provides a means of restoring the flow and integration of a DUE. Public utilities may originate outside of the city depending on the source of water or electricity. If the source of these utilities lies outside of the area of operation, coordination is important to resolving issues inside a DUA. Current joint doctrine categorizes emergency services like hospitals, police and fire departments as service infrastructure but US Army doctrine

includes emergency services under administrative and human services.[29] If the US Army operates in a DUE during future conflict, military units and intergovernmental partners may be required to return the flow as rapidly as possible.

Cultural Infrastructure is not talked about often, but it remains part of the *urban infrastructure categories*. Cultural infrastructure describes the locations at which the populace gathers, groups gather for religious, academic, historical, or leisure activities like sporting events. These locations reflect the identity of the populace and some may be sacred, or a tradition not easily let go.[30]

Whether the US Army addresses infrastructure issues before, during, or after conflict, it is important to maintain or repair it to avoid disruptions. If the population causes unrest over basic utilities, military operations may suffer in and around DUE. US Army forces, Unified Action Partners such as US Army Corps of Engineers, and private contractors may be required to repair these systems. An initial goal in stability should be to return the infrastructure of the city to near pre-conflict conditions to maintain the flow.

Doctrine

Urban Operations doctrine has changed over the years, but ideas set in the earliest US Army manuals, such as "built-up areas should be attacked only when no other alternative is available" continue to be taught in military schools even though not explicated in current doctrine.[31] Understanding the urban environment includes concepts of physical components, population size, major urban patterns, infrastructure, and populace. Appendix A provides general examples from doctrine and how doctrine evolved over the second half of the 20th century into

[29] US Department of Defense, Joint Staff, *Joint Publication (JP) 3-06, Urban Operations* (Washington, DC: Government Printing Office, 2013), II-9; US Army, *ATP 3-06* (2017), 1-20.

[30] US Army, *ATP 3-06* (2017), 1-21.

[31] US Department of the Army, *Field Manual* (*FM) 90-10, Military Operations on Urban Terrain (MOUT)* (Washington, DC: Government Printing Office, 1979), 1-8.

today. Figure 9 in Appendix A shows the timeline of US Army urban doctrine. Before the US Army introduced *FM 31-50, Attack on a Fortified Position and Combat in Towns,* in 1944, historical references drove the action of the US military.

Influences on the original 1944 doctrine go back to Marshal Vauban from the 18th century and Simon Francois Gay de Vernon in the 19th century. Vauban used geometry to reduce exposure of siege lines against fortifications. Siege warfare transitioned into urban warfare through incremental changes over the centuries. Sieges did not go away nor did fighting in urban areas just appear.[32] Vernon's text *A Treatise on the Science of War and Fortifications* was included in West Point Military Academy curriculum from 1817 to 1838. Instruction included field fortifications, permanent fortifications in towns, and attack and defense of such fortifications. The knowledge to fight in urban areas began.[33]

The industrialization in the 1800s expanded urbanization, the number of urban centers increased, and fighting could not be isolated to fighting in open fields and woods. Urban operations include Winfield Scott's attack on a cannon foundry at Molino Del Rey during the Mexican-American War and U. S. Grant's siege of Vicksburg during the American Civil War. Scott's attack on Molino Del Rey was an indirect approach into Mexico City in 1847.[34] Santa Anna's Army defended the capital city of Mexico from the US invasion. Grant's siege didn't include fighting through the streets but rather against the fortified positions around the city. Vicksburg was strategic for its location on the Mississippi River both to move traffic south on the river and as a crossing site for goods for the Confederate States from Mexico via Texas.[35] After

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[32] Azar Gat, *A History of Military Thought: From the Enlightenment to the Cold* (New York: Oxford University Press, 2001), 37.

[33] Michael Bonura, *Under the Shadow of Napoleon: French Influence on the American Way of Warfare from the War of 1812 to the Outbreak of WWII* (New York: New York University Press, 2012), 76-78.

[34] Peter Guardino, *The Dead March: A History of the Mexican-American War* (Cambridge, MA: Harvard University Press, 2017), 267-269.

[35] Terrence Winschel, *Vicksburg: Fall of the Confederate Gibraltar* (Abilene: McWhiney Foundation Press, 1999) 14-17.

the outbreak of World War II, the US Army introduced its first FM to support urban operations in 1944. The US Army updated urban doctrine as changes, new manuals, and subordinate manuals in every decade from 1944 to present.

FM 31-50 (1944-1979)

In 1944, *FM 31-50, Attack on a Fortified Position and Combat in Towns*, provided officers and soldiers frameworks to analyze towns and fight in urban environment for an infantry regiment to a platoon.[36] This manual was the first US Army manual to provide a framework to understand the urban warfare.[37] It published the frameworks and types of physical components of urban areas, the populace, and infrastructure of an urban area which became the common thread in urban operations. The genesis of the urban triad in doctrine begins with these early urban manuals.

FM 31-50 established expectations for the soldiers and leaders fighting in different locations. The manual described the physical aspects of a town including the factories, parks, dispersed homes, isolated building on outskirts, and dense structures of varying heights.[38] The strategic objectives consisted of infrastructure in the form of telephone, gas stations, railroads, and other public utilities.[39] Leaders could identify these locations and set expectations when maneuvering to terrain or enemy-based objectives. The FM stated soldiers should expect to see civilians, criminals, and enemies in an urban environment.[40] Division Planners could use these

[36] US Department of the Army, *Field Manual* (*FM) 31-50, Attack on a Fortified Position and Combat in Towns* (Washington, DC: Government Printing Office, 1944), iv, accessed October 15, 2018, http://www.ibiblio.org/hyperwar/NHC/NewPDFs/USArmy/US%20Army%20Field%20Manuals/USArmy,%20FM%20Attack%20Fortified%20Position%20Combat%20in%20Towns%20FM%2031-50.pdf.

[37] US Department of the Army, *Field Manual* (*FM) 3-06, Urban Operations* (Washington, DC: Government Printing Office, 2003), 1-7.

[38] US Army, *FM 31-50* (1944), 69.

[39] Ibid, 62.

[40] Ibid, 69.

broad categories and frameworks to identify the structures, infrastructure and civilian populations in urban areas with this manual.

FM 90-10 (1970-2001)

The doctrine that carried the US Army into urban areas of Afghanistan and Iraq was *FM 90-10, Military Operations on Urban Terrain (MOUT)*. The field manual was regionally focused on Europe with examples in the Federated Republic of Germany and a Soviet Union threat. The tactics in the manual remained at the brigade and below level including examples from the Inchon landing.[41]

FM 90-10 included the US Army's initial frameworks for urban areas based on population size, functional areas, and street patterns and updated civil considerations. The urban areas included population sizes for the first time (Appendix A). The new framework of functional urban areas assisted leaders and planners with impacts on tactical operations. This framework helped with locating terrain-based objectives oriented on future operation of rebuilding and transitioning. The last framework added was urban area street patterns which offers the commander maneuver options in an urban area based on size and direction of lines of communication.[42] These frameworks assisted commanders and staffs with a better understanding of most urban areas. It lacked the expanded details of infrastructure and flow of current doctrine.

FM 90-10 focused on the physical environment and how it assisted the US Army with tactical concerns but does little to explain the impacts or concerns about governance, infrastructure, and the population beyond a couple sentences in the introduction. This manual improved on the physical characteristics of a city with the physical aspects of urban areas as five building types which are the precursors to functional areas.[43] Though every city may not have all

[41] US Army, *FM 90-10* (1979), 1-2 – 1-6.

[42] US Army, *FM 90-10* (1979), 1-3.

[43] US Army, *FM 90-10* (1979), 1-3. These seven areas include: core; core-periphery; commercial ribbon; residential areas; industrial area; outlying high-rise area; and military facilities.

of these functional areas, staffs at all echelons used the framework to physically subdivide an urban area.

The field manual focused on civilians only on occasion. The manual frequently referenced civilians by their impact to individual types of US Army units. The manual warned that civilians can *siphon* military resources during urban operations and to protect soldiers' lives, they should not hesitate to fire on the enemy in an urban area. The field manual emphasized the morality of US Army actions regarding care for refugees and briefly addressed concerns for civilians and their treatment.[44]

FM 3-06 (2003-2017)

Several months after the invasion of Iraq, the US Army published *FM 3-06, Urban Operations* in 2003. The conflicts and different urban and fortified objectives provided backgrounds for vignettes from World War II, Korea, Vietnam, and Panama. This field manual included a chapter dedicated to the urban environment. The field manual contained the first figure to show the relation between terrain, infrastructure, and society. The chapter on the urban environment modeled urban areas with functional areas in the future.[45] This became the focus of understanding the physical layout of the city.

The core of the city often was identified by areas categorized by physical features such as; the high-rise buildings in the city, the business district includes commercial shopping areas, industrial areas include large sprawling buildings for manufacturing, and other commercial businesses. Beyond the functional areas of an urban area, the infrastructure including transportation, emergency service buildings, and municipal buildings add to the classification of functional area breakdown. The transportation system could be evaluated through the physical layout of street patterns and size. The subway, streetcar, and bus networks include a physical

[44] US Army, *FM 90-10* (1979), 1-1, 2-31, 5-5 – 5-7.

[45] US Army, *FM 3-06* (2003), 2-9 – 2-14.

network of tracks which runs throughout the city. Emergency services include police stations, fire stations, and hospitals which consume large portions of the physical terrain. Governance buildings, whether judicial, executive, or legislative in nature, add to the general physical layout of the city.[46]

The framework for cities based on size changed incrementally with the increase in size of metropolis into a single interconnected urban area. The largest city size was the megalopolis, which addressed the size of cities growing over ten million people.[47] Infrastructure is a means to sustain US or coalition forces through a sustainment lens.[48] The US Army rewrote the manual one more time in 2006 which includes a greater degree of information to prepare for stability operations. The concept of urban flow was not published in either version. The 2006 version included the updated functional areas and the framework continues in *ATP 3-06* today.

ATP 3-06 (Current Doctrine)

The US Army's current doctrine is *ATP 3-06, Urban Operations*. This publication expands on the ideas of infrastructure and their inter connections with the *urban infrastructure categories*, (Figure 3). The new doctrine challenges older frameworks supporting infrastructure, population, and civilians. No longer an obstacle or something to use during operations, infrastructure is something to maintain to support larger populations. The manual no longer relies on population size as a determining factor, but there are fewer categories and a higher focus on population density. During many conflicts in history, armies had clashed inside cities which have grown larger, more complicated, and fragile based on the needs of the population within the city.

The urban model and infrastructure from 2003 developed into urban functional areas in 2006 and the primary way to subdivide a city. The expansion of the urban infrastructure

[46] US Army, *FM 3-06* (2003), 2-8 – 2-12.

[47] US Army, *FM 3-06* (2003), 2-15

[48] US Army, *FM 3-06* (2006), 10-4 – 10-5. Both 2003 and 2006 versions view infrastructure similarly. Chapter 9 in 2003 version includes the same notes.

categories in 2017 to the version in this monograph provided staffs with a better understanding of the interconnected system between the infrastructure, the physical terrain and the population. The Army's functional areas subdivide a city and describe the use of the area or section of town rather than the physical aspects of the city.

The understanding of DUE has grown with the increased publications inside and outside of the military. Doctrine continues to advance from the early versions in 1944 focusing mostly on the military aspect to later versions which attempt to understand the environment with which the US Army fights. As populations migrate, as the UN suspects, larger more complex cities may become part of US doctrine after a future conflict.

The Second Battle for Seoul, 1950

The first case study of urban operations in this monograph is the second battle of Seoul which took place shortly after the Inchon landing in September 1950. Urban doctrine during this period is limited to the lower tactical levels, while doctrine associated with higher echelons like divisions and corps is lacking. The value of planning using the terrain, infrastructure, and populace in the future may avoid outcomes similar to those encountered during and after the second battle for Seoul.

Seoul, the capital of the Republic of Korea, is physically located in the mountains in the northwestern portion of the country. Seoul was the commercial and government capitol for much of Korean history.[49] It remained the capital city after World War II despite its proximity near the border between South and North Korea. The terrain near the city is canalizing because of the mountains surrounding it and the Han River. Mountains and hills north and south of the city

[49] US Department of the Army, X Corps Staff, *Headquarters X Corps, War Diary Summary for Operation Chromite, 15 August-30 September 1950* (1950), 3-5, CARL Library Archives; Robert D. Heinl, *Victory at High Tide: The Inchon-Seoul Campaign*, 3rd ed. (Baltimore, MD: Nautical and Aviation Publishing, 1979), 28. The Japanese built or improved the railroad and road networks to support the movement of goods out of Korea.

dominate the city itself. In 1950, the roads and railroad network originated from Seoul as a hub to other cities and towns.

On June 25, 1950, Democratic People's Republic of Korea (DPRK) invaded south with the support of military training and equipment from Russia. At the time, Seoul had a population of two million.[50] The North Korean People's Army (NKPA) rapidly drove ROK Army forces and their American advisors from the city, but inflicted little damage on the city because of the rapid ROK withdrawal. The ROK government evacuated to Taejon during the battle. To delay the NKPA's advance beyond the city, the ROK Army prematurely destroyed a large bridge leading south from Seoul.[51] Seoul fell to the NKPA on June 28, 1950 and though a large number of refugees fled the city during this time, most civilians were unable to leave and remained behind to continue their lives under North Korean occupation. After securing the city, the NKPA garrisoned one division, an infantry regiment known as the Seoul City Regiment, and an anti-aircraft regiment to guard the city, exert influence, and ensure open lines of communication.

Seoul suffered considerably more destruction with the ROK Army's attack to retake the city in September of 1950. During the second battle of Seoul, the 9th NKPA Division reinforced inside the city of Seoul.[52]As the invasion began, some civilians were pressed into service to support the NKPA. The NKPA stationed in Seoul were unprepared for the X Corp's arrival with 1 MAR DIV in the lead.[53]

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[50] Heinl, *Victory at High Tide*, 29; Jon Dunbar, "Rebirth of a Nation: The Korean War and Reconstruction," Korea Net, May 29, 2012, accessed April 16, 2019, http://www.korea.net/NewsFocus /Society/view?articleId =100532. This article offers that a population of 1.6 million people resided in Seoul and 400 thousand fled as the NKPA attacked south.

[51] O'Ballance, *Korea 1950-1953*, 33.

[52] Heinl, *Victory at High Tide*, 30; Shelby Stanton, *Ten Corps in Korea 1950* (Novato, CA: Presido Press, 1996), 87.

[53] Schmidt et al., *CSI Battlebook 2-D*, 11-16; US Army, *Headquarters X Corps, War Diary*, 26-29. Testimony from NKPA prisoners of war, they thought the NKPA were winning in the South, but did not expect the Inchon Invasion, not expected reinforcements.

The first plan, Operation Bluehearts, was abandoned early as the tempo of NKPA ruled out options to counter-attack in early July. MacArthur chose a new plan that required a new corps to execute. US Far East Command (FEC) Joint Strategic Plans and Operations Group created three different plans, and the plan selected became Operation Chromite. General Douglas MacArthur requested forces immediately in June 1950 but forces were not available as fast as needed.[54]

Planning and Preparation

Planning for the seizure of Seoul began before X Corps existed. Planning began under the direction of US FEC Chief of Staff, Major General Ned Almond, in secret in an airfield hanger in Tokyo, Japan.[55] Almond assumed many roles at this time as the Chief of Staff for US Army FEC, Chief of Staff the UN Command, and Special Planning Staff, General Headquarters.[56] The plan initially envisioned by MacArthur was to land at one of several ports along the coast to cut off the supply lines to the NKPA which eventually reached the perimeter around Pusan.[57] MacArthur chose Inchon despite the negative features to both the Navy and Marine Corps.[58] The force plan for Operation Chromite was hastily thrown together. After FEC was unable to order supplies for an unofficial organization known as Force X, the ad-hoc organization was re-designated as X Corps.[59] MacArthur chose 7 ID as one of the divisions; it was the closest unit that was not already engaged in the conflict, despite its low manning and limited equipment. 7 ID received a large

[54] Stanton, *Ten Corps in Korea,* 28, 30. General MacArthur requested forces from the US Army and again in early July from the US Joint Chiefs of Staff for a late June attack.

[55] Stanton, *Ten Corps in Korea*, 39.

[56] US Army, *Headquarters X Corps, War Diary*, 2; Stanton, *Ten Corps in Korea,* 28, 29; US Army, FEC Staff, *OPLAN 100-B, draft 4,* August 12, 1950 (CARL Library Archives). General orders number 24 appointed MG Ned Almond to X Corps Commander in addition to his duties as Chief of staff.

[57] Stanton, *Ten Corps in Korea*, 29; Heinl, *Victory at High Tide*, 24-25.

[58] Heinl, *Victory at High Tide*, 24-25.

[59] Stanton, *Ten Corps in Korea*, 39-41.

number of new and veteran leaders from the United States and untrained recruits from Korea.[60] The Marine Corps put together the 1 MAR DIV from different scattered regiments around the world including active and reserve units, augmenting the staff and an air wing to create the right requirements for an amphibious landing.[61] The new X Corps with its augmented divisions would be the bulk of the forces for Operation Chromite.

Execution

Operation Chromite began with forces boarding ships and setting sail for the coast of Inchon, ROK. 1 MAR DIV conducted an amphibious landing on the outer islands and then Inchon, seizing the port on August 15, 1950. Attacking toward Seoul, X Corps selected enemy-focused objectives and desired infrastructure to support future operations. 5th Regimental Combat Team (RCT), 1 MAR DIV captured Kimpo Airfield on September 17, 1950 while 1 Marine RCT captured the town on Yongdungpo and 7 ID captured Suwon Airfield.[62] The capture of Yongdungpo allowed maneuver space for the 1 MAR DIV and 7 ID to maneuver outside the city but on the near side of the Han River.

The infrastructure objectives outside the city held great importance to continue combat operations within the city. Kimpo airfield provided a runway long enough to support long distance transports to bring resupply in to X Corps. The 7 ID relieved the 1 MAR DIV and assumed control of Kimpo airfield.[63] The US Army 2d Engineer Brigade fixed a train engine and cars and pushed supplies one day after the landings at Inchon through the seizure of Seoul.[64]

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[60] Stanton, *Ten Corps in Korea*, 53; Heinl, *Victory at High Tide*, 55-56. 7th ID received thousands of untrained Korean recruits and new US Army recruits from the United States in addition to the instructors from field artillery and infantry schools.

[61] Heinl, *Victory at High Tide*, 24-27; US Army, *Headquarters X Corps, War Diary*, 34-36. This airfield supported supplies from cargo airplanes. The cargo was drastically needed to support what was off-loaded at the port.

[62] Heinl, *Victory at High Tide*, 134.

[63] US Army, *Headquarters X Corps, War Diary*, 11.

[64] Heinl, *Victory at High Tide*, 149.

The seizure of the city required more than just one division. The corps' two-pronged attack to seize Seoul included 1 MAR DIV as the main effort in the north and 7 ID as the supporting effort in the south.[65] After fighting from the beaches and Kimpo airfield, 1 MAR DIV fought through the town of Yongdungpo just outside Seoul. The 1 MAR DIV seized the river crossing over the Han River from the north and penetrated into the city before spreading out RCTs to clear different sections of the city. Due to the damage to bridges over the river, the marines conducted a river crossing that led into a maze of river suburbs on the outskirts of the city. As combat operations began, UN forces fixed the railroad faster than anticipated and the marines made use of the existing railroad system to move toward Seoul in greater numbers.[66]

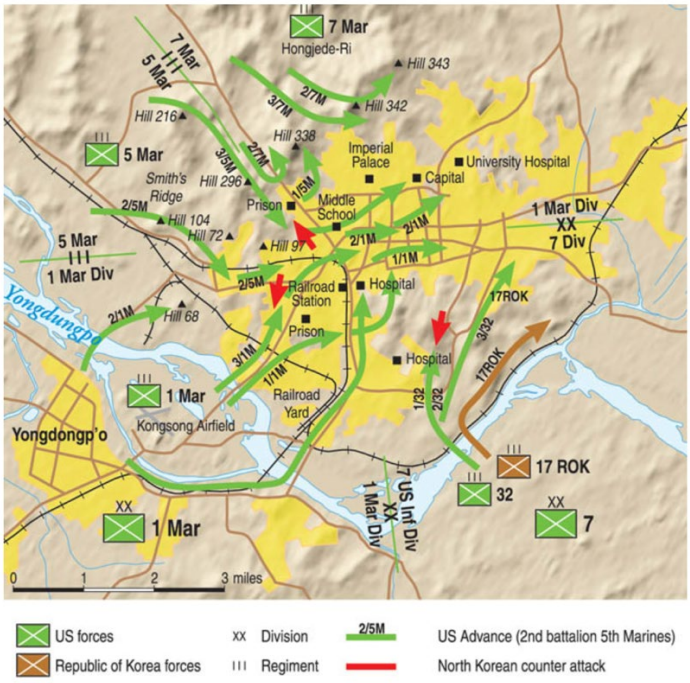

Figure 4. The attack into Seoul; Marc D. Bernstein, "Street fight in Seoul," *Warfare History Network*, accessed 9 May 2019, https://warfarehistorynetwork.com/daily/military-history/street-fight-in-seoul/.

[65] US Department of the Army, X Corps Staff, *Inchon-Seoul Invasion Operations Instructions (No. 1-10)*, September 18, 1950 (CARL Library Archives), 5. Operation instruction (OI) 1 on September 20, 1950 directed 1st MAR DIV to seize and secure and guard from the North. Annex 1 (Operations overlay), OI 2 has a hand drawn overlay with unit icons denoting division movement.

[66] Schmidt et al., *CSI Battlebook 2-D*, 80.

The citizens of Seoul continued to go about their day as if the marines were not present, nor shooting, nor crossing the river.[67] The marines fought house to house through the city. The *X Corps War Diary* notes the Marine's use of air support, mortars, and tanks within the city. The wood structures and extensive fires burned heavily in the city resulting in the loss of homes, businesses, and residents' way of life.[68] Current doctrine states commanders must balance unavoidable damage to infrastructure and its preservation.[69] The balance between mission and collateral damage impacts both current and future operations.

As the marines fought NKPA forces within the city, 7 ID remained outside. On September 25, 1950, Almond directed 7 ID to seize the dominant terrain, Nam-Sam (South Mountain), overlooking the city.[70] Late in the battle, 32 RCT, a US Army RCT reassigned to 7 ID, would cross the Han River on the south side of the city and begin clearing the southern portion of the city.

The second battle of Seoul transitioned with mopping up operations while the official UN ceremony occurred at the capitol building.[71] To show the people of Seoul that they had been liberated, and with only part of the city seized, MacArthur held a liberation ceremony on September 29, 1950 and turned over the government of South Korea to President Syngman Rhee. The 7 ID was relieved of requirements for Seoul later that evening. The 17 ROK Regiment was detached from 7 ID's task organization and remained to control Seoul. UN forces continued to fight heavy pockets of resistance in the city into October. This concluded the second battle of

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[67] Reginald Thompson, *Cry Korea* (London: MacDonald, 1952), 69.

[68] US Army, *Headquarters X Corps, War Diary*, 19; Marc D. Bernstein, "Street Fight in Seoul," Warfare History Network, November 18, 2018, accessed April 13, 2019, https://warfarehistorynetwork.com/daily/military -history/street-fight-in-seoul/.

[69] US Army, *ATP 3-06* (2017), 2-4, 2-9.

[70] Stanton, *Ten Corps in Korea*, 105; Heinl, *Victory at High Tide*, 29, 221. Nam-San or South Mountain had a 900ft peak which rose above the city on the south side.

[71] Heinl, *Victory at High Tide*, 252-257. Mopping up operations is a doctrinal task from *FM 31-50* in 1944. It is the systematic clearing of houses behind the main force. US Army, *FM 31-50* (1944), 54-55.

Seoul. The city remained important to on-going operations and supplies continued to flow from Inchon and Kimpo Airfield as operations continued outside the city.[72]

1 MAR DIV and 7 ID Urban Operations

The tactical actions of both divisions were congruent with doctrine of the time, but the resulting damage increased future complications in the city. War diaries, second hand accounts, and first-person accounts found more evidence of negative impacts than positive impacts on current and future operations from the destruction of the city and the infrastructure. With current perspective of transitioning from LSCO to stability operations or conducting both simultaneously, it is difficult to understand deliberately destroying infrastructure. Regardless of which element leads the stability mission, US military, host nation, or federal agency, the preservation of infrastructure appears to come second to enemy forces.

X Corps orders led to the unnecessary destruction of the city during Operation Chromite. X Corps ordered 1 MAR DIV to conduct a night attack through the city. Night attacks were difficult to control and inside an already destroyed city with enemy in various stages of organization made it more difficult. The *X Corps War Diary* notes 7 ID had not intended the liberation operation result in the destruction of civil institutions, but measuring the amount of destruction required to clear the enemy is subjective.[73] The positive short-term results were achieved through further destruction of the city.

The actions of the regiments, battalions, and companies provide examples of consequences in the rapid seizure of Seoul. The stories of destruction paint a different story of the liberation of Seoul. The marines cleared the city zones inside Seoul, the systematic clearance of the enemy led indirectly to the destruction of the city. During the initial days of the operation, 1 Battalion, 1 Marine RCT delayed their movement from a hill overlooking the railyard while they

[72] US Army, *Headquarters X Corps, War Diary*, 7, 25.

[73] Ibid., 23.

called mortar fire on large numbers of NKPA soldiers throughout the yard.[74] Later, 1 Marine RCT systematically cleared house to house to clear the enemy. However, the units destroyed homes as they went through interior walls.[75] Another example inside Seoul, 11 RCT called artillery directly into the city. One marine called for a battalion twenty from 155mm howitzers from 31st Field Artillery Regiment that caused significant damage to the city.[76] Each gun in the regiment fired twenty rounds into the city against a determined enemy. Not all destruction in the city was due to its liberation.

The ROK Army destroyed bridges leading out of the city during the first battle of Seoul to slow down the NKPA, and these decisions delayed access to the city during its recapture. Early in the clearance operation, the NKPA destroyed infrastructure as well when they built barricades throughout the city out of stones, beams, streetcar rails, and other material.[77] Days later, 1 Marine RCT captured a railyard after marines fought around the standing train cars which resulted in the destruction of the cars and parts of the train yard.[78] The negative impacts compound existing infrastructure problems from the first battle of Seoul. Though these actions cleared the city of NKPA soldiers, it caused damage to some areas of the city that greatly hindered the government's ability to provide necessary services through transportation, commerce, and administrative and human services. The destruction of the railroad demonstrates the challenge associated with balancing current LSCO objectives and future stability requirements.[79] 7 ID destroyed the rail line because the risk of NKPA moving north on the railroad was too great. However, the rail line

[74] Heinl, *Victory at High Tide*, 230.

[75] Ibid., 229.

[76] Ibid., 237. A battalion twenty is the equivalent of every gun in the battalion firing twenty times on to the objective.

[77] Ibid., 229

[78] Ibid., 242.

[79] Ibid., 143.

from Inchon to Seoul provided a way to move current and future supplies from the port to the city.

There are a considerable number of positive examples that support preservation of infrastructure, support for rebuilding, and restraint. Early in the operation outside Seoul, the 32nd Regiment's seizure of Kimpo airfield resulted in minimal damage, while 2nd Engineer Brigade successfully captured and repaired a train engine and railroad cars to support movement of soldiers and supplies from Inchon to Seoul. The 7 ID used local contracting for transportation of supplies, rebuilding the warehouses in Inchon, and labor in general.[80] This effort assisted both UN forces and local support with increased commerce within the city which had a secondary effect of generating income locally. Yet, the balance between negative and positive impacts was heavily shifted toward the negative impact on the destruction of infrastructure by UN forces.

Seoul through the Urban Triad Lens

The urban triad focuses on the complex physical structures, infrastructure, and the population. This frame work evolved over time from the early doctrine used during World War II and the Korean War. From the Second Battle of Seoul, one can see the concept of the urban triad throughout the battle.

The physical layout of the city was much different from the examples in *FM 31-50*. The manual focused on fighting in Europe, where houses are made of block and cities are set up in a grid system with deviations only as needed to conform to natural terrain. The city layout has some areas that resembled blocks, but the residential areas and the back alleys of streets created a confusing web of irregular corridors for the marines and soldiers. Though some of the physical construction of the city was reinforced concrete/multi-storied buildings in the central business district, Seoul contained a large number of wooden and thin metal construction structures.[81]

[80] US Army, *7th Infantry Division War Diary*, 46, 72.

[81] Stanton, *Ten Corps in Korea*, 96.

Using the urban triad and the infrastructure categories from figure 2, transportation infrastructure stands out as having the greatest impact on friendly forces and future reconstruction efforts. X Corps' use of the railroads and airfields proved useful during the operation. 7 ID directed 13th Engineer Battalion to build culverts and roads to replace destroyed bridges and bypasses to specific highways.[82] The seizure of intact infrastructure assisted operations and civilians in their efforts to rebuild their city.

The infrastructure considerations for transportation balanced current and future requirements well, but similar considerations for commerce and energy infrastructure did not. One account from reporter Reginald Thompson described the status communications and power within the city. The telegraph poles and high-tension power lines had collapsed throughout the city.[83] Between air support, artillery, and tank fighting in the city, this is not surprising. Although telegraph lines do not constitute a basic human need, in the current operating environment communication and energy needed to provide services to connect cell phone networks and access to the Internet and supply residential and commercial energy tend to be viewed by the populace as critical.

Shortly after the liberation of Seoul, utilities were limping along or broken. US engineers were working on the water distribution and waste water removal systems. Only one of four power stations survived the conflict and it was the smallest. Volunteer groups were cleaning the streets of debris to help the city return to life.[84] Repairs to the physical infrastructure required different solutions than those of non-physical.

Shifting focus in the urban triad from the physical infrastructure to the population and other forms of infrastructure show a mix of positive and negative examples. Some residents remained in the city while others left their homes. However, the destruction of battle and looting

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[82] US Army, *Headquarters X Corps, War Diary*, Log report #1 from September 26, 1950, 86.

[83] Thompson, *Cry Korea*, 77.

[84] Ibid., 92-94.

tarnished the victory. Due to the fighting in Seoul, there were a large number of displaced people. The destruction in the city drove some residents to cross the Han River by ferry toward Yongdungpo while the marines entered the city via amphibious tractors.[85] Further south, the 7th Military Police Company, ROK police, and intelligence agencies screened people flowing in multiple directions toward and away from the city. Residents of the surrounding areas were moving south while rural populations were making their way toward main roads, and people also moved north as US Eighth Army pushed north from Pusan. The flow of traffic strained the units' abilities to screen the flow of civilians mixed with NKPA forces. The civilians provided information to support the identification of NKPA personnel attempting to evade.[86]

The city of Seoul benefited from leaders and public servants returning or moving to Seoul to assist after the battle was over. At the liberation ceremony, the president assumed control of the ROK. The mayor of Seoul and police chief, who returned to their roles, attended the liberation ceremony. Police drove up from Pusan to provide support to the city after UN forces cleared the city, according to Reginald Thompson, who was traveling with the marines in the city.[87]

From a cultural infrastructure perspective, smaller tactical units took different approaches to preserve the cultural infrastructure during the battle. X Corps ordered 31 RCT to clear the north portion of the city of Suwon and authorized destroying a portion of the wall that circles the city. The 31 RCT accomplished the mission without destroying the heritage of the city.[88] This highlights the importance placed on the infrastructure in comparison to the threat. Other examples include looting by marines in the governance center or the malicious destruction of property

[85] Thompson, *Cry Korea*, 74.

[86] US Army, *7th Infantry Division War Diary*, 40. Within the division war diary, the staff wrote the narrative section by day. These entries are from September 22, 1950.

[87] Thompson, *Cry Korea*, 86, 93-94

[88] US Army, *7th Infantry Division War Diary*, 43.

during clearance operations.[89] These examples highlight some of the impacts on the cultural infrastructure.

Conclusions

Analysis of the first battle of Seoul suggests the importance of preserving transportation networks, energy sources, and distribution systems. The importance of the enemy objective outweighed the preservation of the physical infrastructure required for the future. Conflicting guidance regarding the importance of preserving buildings and a lack of doctrine on the topic led to the destruction of residential, commercial, and industrial areas. At the corps and division level, the operation required multiple highways, railroads, and airports to support UN forces movement. The transportation infrastructure was preserved or secured more often than destroyed based on the research of this case study.

The importance of other infrastructure systems is not nearly as clear. The source of the destruction of power systems, water distribution, and sewage was unclear. Actions from either the UN or DPRK may have caused the damage. US actions during the stability phase focused on returning these services back to the people. The basic needs of clean water and sanitation can prevent the outbreak of disease and help return or improve the quality of life in a city. In Seoul, the mayor and police chief returned just after the conflict, which reestablished both the administrative control and law enforcement institutions. The availability of police from other regions to enforce the law after the conflict may or may not have reduced criminal issues for Seoul.

A balance of preservation of infrastructure and destruction of enemy in urban operations may be important for future urban operations in DUE. Though Seoul had a smaller population than today's megacity, it was still densely populated in 1950. The doctrine at the time versus

[89] John Toland, *In Mortal Combat: Korea, 1950-1953* (New York: William Morrow and Company, 1991), 225, 226; Thompson, *Cry Korea*, 76.

complexity of the city and the mission is analogous to the difficulties we are likely to face in the more massive urban environments of future operations.

Baghdad, 2003

> In the city center, civilians were blundering into the fight. Many residents were not yet aware that American tanks had penetrated downtown districts, and they went about their normal business . . . traffic was lighter than usual but some shops and saline stations remained open, even as Fedayeen and Baath Party militiamen surrendered through the streets.
>
> — David Zucchino, *Thunder Run*

This case study focuses on the 3 ID actions and objectives oriented on aspects of the urban triad to support friendly operations on the way to and within the city of Baghdad, Iraq. Political decisions and those of CENTCOM, III Army, and V Corps shape the actions of the division. The timeline of this case study begins with the invasion on March 19, 2003 through end of April. Events prior to and after the fall of the city provide context to actions required in DUE. The reports, books, and first-hand accounts create a narrative of lost opportunities in the city of Baghdad during and after decisive operations.

Before Operation Iraqi Freedom began, in response to Saddam Hussein's perceived development of weapons of mass destruction, the US Government used simultaneous strategic actions in the diplomatic, economic, and information instruments of power resulting in a military intervention in 2003. The UN placed economic sanctions which restricted their imports and selling of oil. In 2003, shortly before the invasion, the US Secretary of State, Colin Powell, brought intelligence information to the UN to demonstrate the global risk Iraq's leadership presented to the world. The UN weapons inspectors left the country on March 17.[90] US President George W. Bush offered Saddam Hussein an opportunity to surrender power before military

[90] White House, *U.S. Secretary of State Colin Powell Addresses the U.N. Security Council* (Washington, DC: The White House, February 2003), accessed April 19, 2019, https://georgewbush-whitehouse.archives.gov /news/releases/2003/02/20030205-1.html.

action.[91] Eventually, Coalition Special Operations Task Force members entered Iraq to prepare for the upcoming invasion. The invasion of Iraq began on March 19, 2003.[92]

Planning and Preparation

Long before Operation Iraqi Freedom began, CENTCOM planners created multiple versions of an operations plan (OPLAN) to invade Iraq to meet changing political objectives and constraints. An OPLAN, much like doctrine, is written and rewritten overtime. The changing political conditions, constraints, or military objectives justify updates and revisions. In the wake of the US intelligence, United States Central Command, led by General Tommy Franks, revised the most recent version of the OPLAN, designated 1002-92, into the final version for the actual war against Iraq, numbered 1003V.[93] The operational objective of 1003V was to remove the Iraq regime from power, and infrastructure was considered to be of strategic importance. US Secretary of Defense, Donald Rumsfeld ensured CENTCOM planners considered protecting the oil infrastructure outside the cities during early plans.[94] The loss of these fields, as in 1991, would affect the global economy. Eventually, 1 MAR DIV secured the oil fields.

The invasion of Iraq included an international coalition to buildup forces in Kuwait and Turkey with conventional and special operations forces.[95] The CFLCC (III Army) and V Corps planners collaboratively worked on the mission requirements to execute initial ground operations focused on the enemy, necessary infrastructure, and locations to support future operations that were essential to transition and stability operations afterward.[96] A Rand study identified multiple

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[91] Gregory Fontenot, E. J. Degan, and David Tohn. *On Point: The United States Army in Operation Iraqi Freedom* (Fort Leavenworth, KS: Combat Studies Institute Press, 2004), 86.

[92] Rayburn et al., *The US Army in the Iraq War Volume 1*, 81.

93 Gordon Rudd, *Reconstructing Iraq: Regime Change, Jay Garner, and the ORHA Story*. (Lawrence, KS: University Press of Kansas, 2011), 33-44.

[94] Ibid., 50-51.

[95] Rayburn et al., *The US Army in the Iraq War Volume 1*, 35.

[96] Ibid., 35, 40, 59.

instances of incorrect assumptions which would lead to stability issues in the future.[97] The final version of the OPLAN included joint forces from the United States and an international coalition to invade from Kuwait in the south. The US V Corps attacked from the Southwest, US 1st Marine Expeditionary Force (I MEF) with British 1st Armored Division attacked from the Southeast simultaneously.[98]

V Corps, III Army, and CENTCOM planned concurrently leading up to the invasion. V Corps approached the city of Baghdad through a systems analysis of Saddam's control of the city. Figure 5 shows the base categories and subordinate infrastructure. The figure focused on Saddam's control of the city and Iraq, not the system of the city.

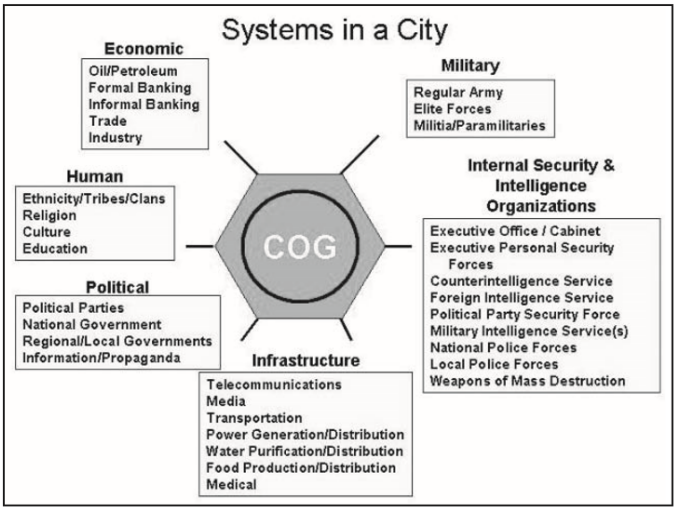

Figure 5. Understanding Baghdad As a System; Gregory Fontenot, E. J. Degan, and David Tohn, *On Point: The United States Army in Operation Iraqi Freedom* (Fort Leavenworth, KS: Combat Studies Institute Press, 2004), 49.

V Corps focused on how to solve the operational problem of regime change mentioned earlier, but the location resided in one of multiple possible locations in a DUE. The V Corps system demonstrates both systems fused into one model. The addition of national level

[97] Nora Bensahel, Olga Oliker, Keith Crane, Richard R. Brennan, Jr., Heather S. Gregg, Thomas Sullivan, and Andrew Rathmell, *After Saddam: Prewar Planning and the Occupation of Iraq* (Santa Monica, CA: RAND Corporation, 2008), 10-16.

[98] Rayburn et al., *The US Army in the Iraq War Volume 1*, 85.

government and military structure in the model are specific to the scope of the V Corps problem. The figure above includes similar concerns to table 1, which is based on current US Army doctrine and publications. V Corps plans during the invasion are included in the next section when relevant to 3 ID's actions.

From OPLAN to execution, the move from decisive operations to the *transition phase* was unclear. The Office of Reconstruction and Humanitarian Assistance (OHRA), led by retired General Jay Garner, had planned for months to lead the transition phase after the military accomplished the military end state still lacked the personnel to lead the transition phase. US President George W. Bush designated a special envoy to Iraq to lead the organization, previously known as OHRA. L. Paul Bremer led the Coalition Provisional Authority (CPA) three weeks after beginning the transition phase.[99] The lack of personnel in the organization meant the military needed to implement many of the actions. The 3ID participated in the decisive action and the beginning of the transition phase of this operation.

Execution

During the initial hours of the ground invasion, V Corps and I MEF executed a rapid penetration of southern Iraqi defenses toward their operational objective, Talil Airfield and the strategic oilfields respectively. 1 MAR DIV and 3 ID met in Baghdad on April 6, shortly before the collapse of the Iraqi Government. 3 ID's portion of this operation included a rapid and deep penetration into Iraq leading up to western and northern Baghdad with a focus on enemy locations and infrastructure to support future operations.[100] Before the division could reach the outskirts of Baghdad, it first maneuvered on a long stretch of highways, roads, and open desert. The division fought multiple conventional and irregular forces, seized airfields and bridges,

[99] Special Inspector General Iraq War, *Hard Lessons: The Iraq Reconstruction Experience* (Washington, DC: Government Printing Office, 2009), 69.

[100] Rayburn et al., *The US Army in the Iraq War Volume 1*, 102.

guarded intersections outside the city designated as operational or tactical objectives, before reaching the outside of the city.

The operation began with a series of brigade and battalion level objectives for the next two weeks. The 3rd Brigade of 3 ID (3/3 ID) seized Talil Airfield (Objective Firebird), the military base in close proximity (Objective Liberty), and crossing sites on highway 1 (Objective Clay) to support continued movement by V Corps and I MEF north.[101] Collectively they represented two operational objectives and one tactical objective. Objective Liberty consisted of a small Iraqi military garrison located near the airfield. After securing the airfield, the division continued northwest to secure transportation infrastructure outside various cities along the route. The objectives included As-Samawah (Objective Chatham), a bridge outside Najaf (Objective Floyd), and possible sites from which to stage and launch attacks toward Baghdad (Objectives Raiders and Rams).[102] As the lead unit in the corps, 3 ID secured each multiple objective to ensure the Corp's line of communications (LOCs) remained open and only several objectives enemy focused. The 82nd Airborne Division and 2nd Cavalry Regiment relieved 3/3 ID in As-Samawah on March 29, allowing 3/3 ID to rejoin the division further north to address the crossings at the Karbala gap.[103] Objective Peach was a small bridge with an important task. This bridge, separated from the highway, was important based on the direction of 3 ID. It was not a highway bridge or a main road, the site was further away from populated areas which masked the movement of the division. While 3 ID pushed north, the Iraqi forces damaged the bridge, but not enough to stop the crossing. Eventually engineers emplaced a ribbon bridge while 1/3 ID rapidly moved north.[104] Though small, its importance grew as part of the ground LOCs for V Corps.

[101] Fontenot, Degan, and Tohn, *On Point*, 115-117.

[102] Ibid., 126-129, 160-165, 168.

[103] Rayburn et al., *The US Army in the Iraq War Volume 1*, 93-94.

[104] Fontenot, Degan, and Tohn, *On Point*, 301.

3 ID Urban Operations

As the Operation neared Baghdad, V Corps designated Baghdad International Airport (BIAP) as objective Lions. This objective held two purposes; it terminated a transportation source for Iraqi senior officials and provided a new LOC and future basing for coalition forces. On April 3rd, the 3 ID Commander, MG Buford Blount, requested permission to seize the airfield from V Corps. He believed 3 ID was in position and capable of accomplishing the mission. Blount tasked 1/3 ID to seize the airfield by the morning of April 4 and conducted systematic clearance for two days. 1/3 ID spent several days securing the area and preventing Iraqi counter-attacks from regaining it. The airport became the base of operations and forward logistics for the division.[105]

Once secure, these initial infrastructure objectives provided a future logistics node and base of operations for US Army aviation to extend their operational reach over the city and surrounding area.[106] The 3/3ID forward logistics element relocated onto the airport afterwards. This site provided a location for all the ammo and fuel required throughout April for 3/3ID. The forward support battalion would remain outside the city due to size and vulnerability.[107] After the seizure, a forward element of the division headquarters set up on the airfield; Blount was ready to lead operations deeper into Baghdad.

While 1/3 ID maneuvered toward Objective Lions, 3-7 Cavalry Squadron maneuvered much further north and executed a guard at the intersection of Highways 1 and 10. This location was an intersection of east-west and north-south transportation infrastructure. Its importance was temporary outside the city and relative to enemy and friendly forces. The guard position was intended to stop reinforcements from moving into Baghdad and eventually mask 3/3 ID's

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[105] Ibid., 301, 310.

[106] Rayburn et al., *The US Army in the Iraq War Volume 1*, 85.

[107] John McCool, "Interview with LTC Ed House" (The Operational Leadership Experiences Interview Collection, Combat Studies Institute, September 26, 2006), 5. Forward Support Battalions contain a large number of vulnerable vehicles to enemy armor, infantry and field artillery. The unit requires are large amount of space to support brigade.

movement to objective Titans.[108] In support of V Corps' emergent plans to conduct raids into the city, 3 ID conducted a reconnaissance mission into Baghdad. The original plan included a cordon of the city, but due to the unknown enemy composition and disposition, operations in Baghdad remained flexible.[109] To visualize the upcoming missions into Baghdad, the division commander needed to understand the enemy composition and disposition, before he directed forces toward the strategic objectives of the Baath Party headquarters and the central government facilities.[110] The division tasked 2/3 ID to conduct a reconnaissance mission into the city while 1/3 ID maneuvered to the Northwest of the city to block routes leaving the city to other parts of the country which were not under coalition control.[111]

A battalion task force from 2/3 ID departed from Objective Saints to conduct a reconnaissance mission known as *Thunder Run* on April 5 into Baghdad to determine the defenses and enemy disposition. Figure 6 shows the general direction of the 1-64 Armor Battalion's mission and link-up with 1/3 ID located at the BIAP (Objective Lions). The purpose of the first mission was to enter the city to determine the composition and disposition of the enemy. The Brigade secured internal objectives to protect their ground LOCs while the taskforce completed the mission. Soldiers and leaders were not prepared for built in bunkers in the city landscape that had been built by the Iraqi Army and oriented toward the highway. The 2/3 ID lost their first vehicle of the mission to such a fortified-position along the highway.[112]

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[108] Fontenot, Degan, and Tohn, *On Point*, 300-301.

[109] Ibid., 331.

[110] Rudd, *Reconstructing Iraq*, 43-44.

[111] Rayburn et al., *The US Army in the Iraq War Volume 1*, 99-100.

[112] David Zucchino, *Thunder Run: The Armored Strike to Capture Baghdad.* (New York: Grove Publishers, 2004), 22.

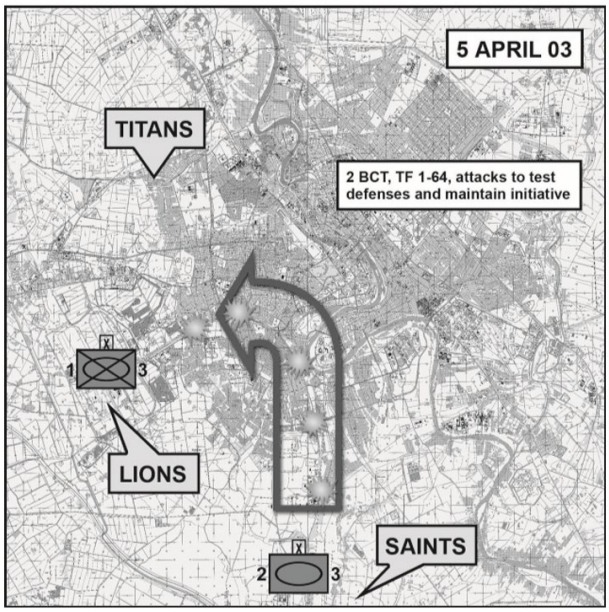

Figure 6. 1-64 Armor Battalion Reconnaissance Mission on April 5, 2003. Gregory Fontenot, E. J. Degan, and David Tohn, *On Point: The United States Army in Operation Iraqi Freedom* (Fort Leavenworth, KS: Combat Studies Institute Press, 2004), 341.

The urban infrastructure was inherently canalizing. Large buildings and streets focused the flow of traffic in order to support the daily ebb and flow of civilian traffic, and as a result complicated military operations tending to move in a single direction. Buildings, barriers, and elevated surfaces can canalize military vehicles. The loss of several vehicles in this environment can create an obstacle to the unit's mission. A mobility kill or catastrophic kill of a vehicle or two can delay or halt sections of a convoy in an urban area. The 2/3 ID encountered this self-imposed obstacle early in the mission after the loss of a tank on the road.[113] Brigade objectives included the complicated interchange known as *Spaghetti junction*. The loss of the interchange could create a future tactical problem if the flow of military supplies or units were to be denied. Though there were not significant flow problems from civilian traffic to further restrict the taskforce, the routes through the city increased the difficulty of navigation.

[113] Zucchino, *Thunder Run*, 26.

Thunder Run II began on April 7, 2003. While on the objective, COL David Perkins requested permission to stay in position from MG Blount.[114] His request proved difficult as the mission continued and Iraqi forces fought for their strategic objectives and protection of important cultural sites. The brigade's maneuver started out very similar to the previous Thunder Run but instead of turning west toward the airport, 2/3 ID forces moved north through a series of intersections to secure cultural and administrative infrastructure. The 2/3 ID designated the intersections as objectives Curley, Larry, and Moe. Figure 7 below shows the objectives in relation to the city of Baghdad. These objectives were significant to keep the LOCs open for the brigade and maintain the flow for the brigade but did not constitute critical transportation infrastructure within the city. Their importance is relative based on the direction of travel by 2/3 ID and cross mobility corridors, not for their effect on the future flow of traffic.

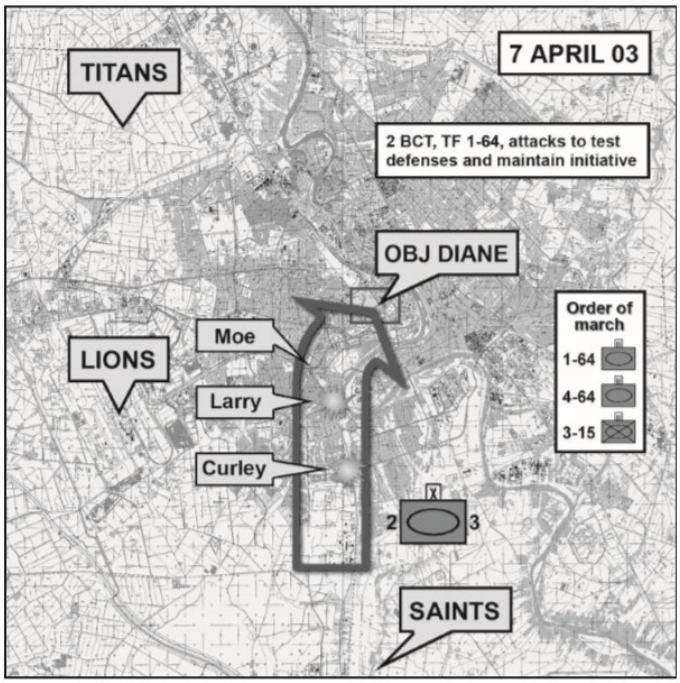

Figure 7. 2/3 ID Attack into Baghdad. Gregory Fontenot, E. J. Degan, and David Tohn, *On Point: The United States Army in Operation Iraqi Freedom* (Fort Leavenworth, KS: Combat Studies Institute Press, 2004), 348.

[114] Fontenot, Degan, and Tohn, *On Point*, 336.

Objective Diane (Tomb of the Unknown Soldier, parade grounds) and objectives Woody East and West (two palaces on the river) were significant to the mission not as cultural and military infrastructure but for the symbolic nature to the Iraqi forces. Saddam had previously established the importance of the parade grounds for messaging to the world on his own behalf and now Perkins used the same location to convey through the media the coalition message to residents, Iraqi officials, and the world audience. The units found the palaces vacant except a small number of guards outside the military headquarters. Figure 8 shows the close proximity many of the objectives were to one another.

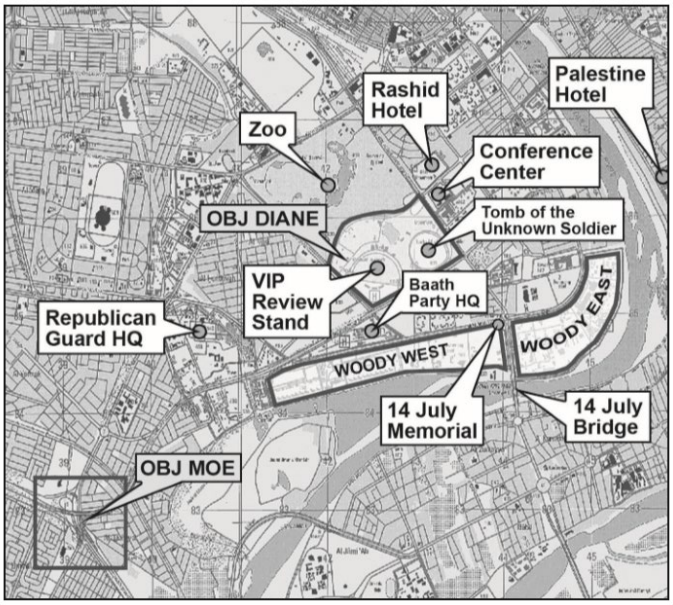

Figure 8. Detailed Perspective of 2/3 ID Objectives in Baghdad. Gregory Fontenot, E. J. Degan, and David Tohn, *On Point: The United States Army in Operation Iraqi Freedom* (Fort Leavenworth, KS: Combat Studies Institute Press, 2004), 332.

The 3/3 ID's mission was to attack to the northwest of Baghdad and seize bridges on the routes outside the city known as objective Titans.[115] The brigade completed this mission on the evening of April 6, seizing a series of intersections and a bridge on the objective.[116] The brigade defended the locations with company teams. The seizure of this important physical terrain was

[115] Fontenot, Degan, and Tohn, *On Point*, 248.

[116] Rayburn et al., *The US Army in the Iraq War Volume 1*, 101.

enough to warrant multiple counter-attacks by Iraqi forces attempting to leave the city. On April 7, the Iraqi counter-attacks began to adapt and change tactics. The Iraqi forces attempted to use a heavy crane to remove obstacles and later attempted to destroy the bridge with sappers.[117] In a DUE, where man-made structures canalize the terrain so much, any open roads or bridges can become key terrain at the tactical level based on the relative positions of both sides. More importantly, depending on the concern for civilians on the battlefield, there can be locations that could be key independent of either side's positional advantage. On April 8, the 3/3 ID commander sent a battalion to link-up with 1/3 ID on objective Lions and on April 10 sent another task force south along Highway 1 to link-up with 2/3 ID. Phase III abruptly ended after this day, though pockets of activity would continue, the mission for units would shift rapidly to a new type of mission.[118]

Throughout Baghdad, the enemy conducted multiple counter-attacks from April 6 to April 8 to defeat 3ID on each brigade objective. The 3/3 ID defended against counter-attacks on objective Rommel. The 2/3 ID defended the bridges over the Tigris River near objectives Woody East and West. On April 9, two of the three brigades fought their way down the main highways to 2/3 ID's position in the center. The collapse of uniformed resistance in Baghdad occurred shortly afterwards. The 3ID assigned specific operation areas to each of the brigades with orders to reduce symbols of the regime.[119]

The 3 ID shifted mission focus and assigned battle spaces and tasks to the subordinate brigades in 3 ID. The 1-15 IN, part of 3/3 ID, focused on an agricultural school, policing functions to maintain the flow of traffic, attempting to locate Iraqi Police and secure gas stations. In an interview, LTC Ed House mentioned the battalion was able to pick their rehabilitation

[117] Fontenot, Degan, and Tohn, *On Point*, 375-376.

[118] Ibid., 312-321.

[119] Ibid., 372-376.

project.[120] This decentralized process of working on projects led to the disjointed efforts by units to assist the Iraqi people. This corresponds with the turmoil of Phase IV planning between levels of the military and CPA.

Looters significantly degraded future capability of human and administrative services when they looted police stations and government offices. Other cultural sites like museums and other historic sites were not a security priority until April 11, when looting and destruction of property became prevalent.[121] The looting occurred during the period at the abrupt end of the decisive phase when no government and no police were available to control the population's actions.

After the decisive phase was complete, the focus slowly changed to reconstruction. Congress authorized funds to rebuild Iraq in April 2003. OHRA attempted to organize the post conflict reconstruction efforts theater-wide, but shortly after arriving, Jay Garner received his replacement and OHRA transitioned into CPA. The new organization allocated money based from designated funds and revenues. The Department of Defense received $518.3 million and the United States Agency for International Development (USAID) received $1820.3 million in the first Iraq Relief and Reconstruction Fund payment. CPA attained additional funding for reconstruction through several sources; Iraqi money seized before the invasion and oil and gas revenue under UN programs. The CPA named this program Commander's Emergency Relief Program in June 2003. This allocated money to military commanders within the parameters from CTF-7 Commander, General John Abizaid.[122] The US military also used seized funds to begin reconstruction projects. Military commanders received funds to use on various projects or

[120] McCool, "Interview with LTC Ed House," 6-7.

[121] Rayburn et al., *The US Army in the Iraq War Volume 1*, 112; McCool, "Interview with LTC Ed House," 6.

[122] Special Inspector General Iraq War, *Hard Lessons*, 81.

purchases to improve Iraq. This highly decentralized approach limited the potential for synergy through theater-wide prioritization of reconstruction projects to meet critical needs.

It was difficult to capture portions of the urban triad hidden in books, official histories, and interviews. The urban triad or subcomponents of it are not often the stories told about conflict. There is more to these types of locations, the civilians, and infrastructure that may support future objectives in DUE.

Baghdad Through the Urban Triad Lens

In 2003, the city of Baghdad represented Saddam's power both physically and psychologically. The city was dominated by national government infrastructure, like the Baath party Headquarters (Sujud Palace), and important cultural sites, like the Iraqi Tomb of the Unknown Soldier.[123] The BIAP was located on the west side of the city.

A UN report found the government support for Baghdad to have centralized control of the city which would normally control the cities growth but the internal systems lacked the checks and balances to prevent corruption. The city was eroding when US forces arrived. Due to its size and media presence, Baghdad became a focus of Iraq while the US Army attempted to prevent the city from crumbling.

The strong central government and central location of the city facilitated the figurative flow of services from the capital. The transportation network facilitated the flow of goods and people. The Highways 1, 2, 8 and 10, which connected the country in all cardinal directions, converged near or within the city.[124] This road network supported a population of 5.6 to 7 million people within the city and those that traveled through or around it.[125] The flow of services may have come from the capital but the highway system allowed commercial goods and people to

[123] Zucchino, *Thunder Run*, 74-75.

[124] Fontenot, Degan, and Tohn, *On Point*, 331

[125] Rayburn et al., *The US Army in the Iraq War Volume 1*, 149, 214.

flow in and out of the city. The network would also support the rapid movement and maneuver of 3 ID leading up to the city. The transportation infrastructure remained intact from both sides. The Iraqi forces left roads open to allow fuel and supplies to freely move to Republican Guard forces.[126] On April 3, 3 ID disrupted some infrastructure when 3/3 ID destroyed a highway bridge near objective Monty in early April.[127] During the invasion, Forward Engineering Support Teams located in the US Army brigades assessed the infrastructure to ensure support for the dynamic loads of US Army equipment and for future reconstruction. As the invasion began, engineers began to survey and assess the disrepair in Iraq's infrastructure.[128]

The 11th Marine Field Artillery Regiment in Baghdad used innovative practices to solve tactical problems while making use of infrastructure for tactical operations. The marines used race tracks, stadiums, and roadways to establish position areas for artillery. The open fields of fire provide space to fire and set up radars to acquire targets. The marines used aviation with precision munitions to engage radar acquired targets and tube artillery to engage other targets.[129] This method was innovative but put cultural infrastructure at risk. Other open areas such as green space or parks could be used in the future with similar results.

The status of Baghdad's physical infrastructure after the war remains contested. The United States and the Iraqi forces destroyed some infrastructure; for sure 3/3 ID destroyed a highway bridge near objective Monty and the Iraqi forces destroyed the bridge on objective Peach during the crossing.[130] It is possible, both sides destroyed infrastructure while focusing on the opposing force but the overall level of infrastructure destruction is still hotly debated. In *On Point*, the authors stated that "Most of the infrastructure—utilities, water, power, and sewage—

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[126] Zucchino, *Thunder Run*, 140.

[127] Fontenot, Degan, and Tohn, *On Point*, 376.

[128] Special Inspector General Iraq War, *Hard*, 59.

[129] Michael R. Melillo, "Cannon Cockers at War: The 11th Marines in Operation Iraqi Freedom," *Field Artillery* (September-October 2003): 24-28, 27.

[130] Fontenot, Degan, and Tohn, *On Point*, 376.

remained in the condition left by the failed Ba'athist regime."[131] The Inspector General for Iraq Reconstruction, in the book *Hard Lessons*, suggested that smart bombing had caused the damage to telephone service, broken water pipes which mixed with sewage, and eventually the loss of electricity on April 4 after power surges shorted out the infrastructure. Yet *Field Artillery* magazine notes that field artillery units used Variable Time and High Explosive shells to reduce the destruction of buildings while engaging the enemy.[132] So while results were mixed, evidence suggests that infrastructure considerations played a larger part in both planning and execution.

Civil unrest was tremendous after the fall of the government and loss of government services. Without administration and human services, police forces, internal security forces and hospitals were no longer functioning. The *New York Times* reported looting by the truck load of hotels, ministry offices, palaces, and hospitals immediately afterwards.[133] The speed of phase III, the lack of trained forces for phase IV, and incorrect pre-war assumptions led collectively to a grave situation of which people who mostly knew oppression, took advantage.

During the interview with House, he believed people were attempting to return to some sort of normalcy, but the local populace found it difficult. The 3rd ID had to stop looting and determine how to rapidly return the flow of the city back to normal. This required locating the police officers and building projects to help the population. House mentioned that the battalion found the population had looted supplies before the unit knew what to purchase. Eventually his unit resorted to the black market for reconstruction supplies and inflated prices for reconstruction goods.[134]

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[131] Fontenot, Degan, and Tohn, *On Point*, 378.

[132] James Greer, Martin Holland, and Charles Kean, "101st DIV Arty: Fighting with Artillery Fires in an Urban Environment," *Field Artillery* (September-October 2003): 14.

[133] Dexter Filkins, "A Nation at War: Iraqi Capital; In Baghdad, Free of Hussein, a Day of Mayhem," *New York Times*, April 13, 2003, accessed March 31, 2019, https://www.nytimes.com/2003/04/12/world/a-nation-at-war-iraqi-capital-in-baghdad-free-of-hussein-a-day-of-mayhem.html.

[134] McCool, "Interview with LTC Ed House," 10.

Forces within 3rd brigade were not ready for an urban fight with armor vehicles. In *Thunder Run*, Major Michael Donovan, compared the fighting in the city to fighting on the New Jersey turnpike and how they had not trained to fight urban combat.[135] The brigade was ready for LSCO-like operations but not ready for urban operations in DUE nor stability operations.

With so much focus on the DUE itself, another part of the system includes the infrastructure or utilities that reside outside the city but in support. Utilities may not originate inside the city. Highways, railroads, water sources, and power generation are some of the infrastructures that may lie outside the city. In Iraq, the hydroelectric dam at Hadithah was an objective from both sides. Even though this objective is outside the city, it is included in the case study due to the impact on the DUE. The 3rd Battalion, 3rd Infantry Regiment (Rangers) secured the dam on April 1, 2003. The Ranger Battalion defended the bridge for three weeks.[136] The dam was important to the people in and around Baghdad for three reasons. The dam was one of two which provided power for Baghdad while the other resided in the Marine area of operation. It was a source of drinking water for the city. Its destruction would have had long-term effects on the people and the reconstruction of the city. Not only would the water levels go up to flood stage, but also potential for debris from the dam and other affected structures could destroy infrastructure over the river. Now the additional areas become important outside the city to ensure the city is functioning.

The transportation infrastructure remained relatively intact in V Corps' area of operation. The roads, bridges, and airport avoided severe damage during the conflict. After 1/3 ID seized BIAP, engineers began work on the infrastructure quickly. The brigade cleared buildings, hangers, and subterranean areas. Besides clearing, 11th Engineers worked to get power, water, and sewage removal working in the airport.[137] After April 11, 3 ID Division Artillery Brigade

[135] Zucchino, *Thunder Run*, 15.

[136] Fontenot, Degan, and Tohn, *On Point*, 252.

[137] Ibid., 310.

(DIV ARTY) assumed responsibility for force protection. Throughout the month, the unit worked closely to ensure local contractors could repair the runway and prevent further looting of the airport. Eventually, DIV ARTY became responsible for supporting the movement of international aid workers after the airport reopened to allow humanitarian assistance.[138]

Most bridges in and around 3ID objectives and lower echelon positions remained intact. The 3ID destroyed only one bridge northwest of Baghdad, and the Iraqi forces destroyed one bridge near Najaf south of the city to prevent coalition movement. Another bridge, damaged by Iraqi forces outside of Najaf was capable of military vehicle crossing after an engineer assessment approved it for safety. The engineers used a system to communicate with engineers in the United States to determine if the bridge could handle the long-term loading by the corps LOCs.[139] The Forward Engineering Support Team capability enhanced the assessment and rebuilding process. The transportation infrastructure survived the conflict with minimal repairs to restore flow to the city.

A limited number of vehicles were on the road during major combat operations. Some vehicles were driven by Iraqi forces moving across the city to fight or Vehicle Borne Improvised Explosive Devices (VBIED) and others were civilians still moving throughout the city. One of the first taxis observed in the city by 3 ID was a VBIED.[140] If the flow of the city was to return closer to normal, than military and civilian agencies needed to create the illusion of normalcy. The US Army needed tactical success in multiple locations and infrastructure to recreate flow. Units needed to secure gas stations for civilians, find police to maintain the law, and clear highways and roads. Soon the population and commercial industries would be able to transport goods into the city.

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[138] Kevin J. Podmore, "Force Protection for Baghdad International Airport," *Field Artillery* (September-October 2003): 47-49.

[139] Fontenot, Degan, and Tohn, *On Point*, 206.

[140] Rayburn et al., *The US Army in the Iraq War Volume 1*, 94; Zucchino, *Thunder Run*, 174.

Conclusions

The urban triad and urban infrastructure categories are doctrinal frameworks to analyze the actions of 3 ID during phase III and transition into phase IV. The 3rd ID and its brigade's objectives represent both an enemy and terrain focus. The division protected several pieces of infrastructure that were important to operations but not as important as other, more important, infrastructure was to the population. However, as operations transitioned, tactical units missed opportunities to adapt as the strategic and operational conditions changed. The division missed opportunities to secure important infrastructure during phase III and the transition proved detrimental to future missions.

During phase III, 3 ID secured several locations which supported the flow of goods in and out of the city; however, the highway objectives were temporary and focused on friendly and enemy requirements. The international airport was a long-term objective which supported the flow of humanitarian aid from the international community. Looking toward the future, only the airport supported flow and commerce generation. The brigade objectives at the parade field, palace, and ministry of information supported the US counter-narratives to Iraqi claims but provided very little to the population or preservation of infrastructure.

The urban triad focuses greatly on three separate parts of the urban triad. It does not provide an accurate representation of the system which connects the components in multiple ways. The triad does not assist a staff with prioritizing infrastructure to support the population. The division infrastructure objectives focused more on denial of access in phase III than preservation for phase IV.

Future Operations in Dense Urban Environments

Similarities and Differences

The urban triad, though not part of doctrine during either conflict, has its origins in the thoughts of military theorists and practitioners before the US Army produced *FM 31-50,* and reflects years of changing urban operations doctrine and lessons learned during conflict. The two case studies demonstrate several continuities and differences in their stories and outcomes. In both cases, unit actions and outcome may be useful to future division staffs focusing on dense urban environments. The Seoul case study juxtaposed against the Baghdad case study demonstrates the difference between a smaller city, destroyed during combat with a functioning government and a much larger modern city, with less damage from combat but no functioning government at the local or national levels.

The coalition force's operational reasons to enter each city were similar on a broad scale. These decisions were made above the division level in both cases and in each, it took multiple divisions to accomplish the mission in the city. Both cities were operational objectives because of their political importance as the national capital. MacArthur demonstrated a desire to return to Seoul very early during the conflict. The location of the city could cut off the enemy supply system and envelope NKPA forces still fighting UN forces along the Pusan perimeter in the south. In 2003, CENTCOM planners focused on regime change in Iraq. The CFLCC operation led divisions directly to Baghdad. In the beginning of the operation, V Corps had not assigned a unit to enter the western side of the city; 3 ID had the capacity and was in position to maneuver into Baghdad.

From the division level in both case studies, 1 MAR DIV and 3 ID focused on the enemy rather than physical objectives in and around their respective city. The 1 MAR DIV and 7 ID focused on operations leading up to Seoul and approached Seoul based on the terrain and enemy. The focus for 1 MAR DIV was to seize Seoul, but the division went further and cleared the city

systematically. In Iraq, 3 ID focused on their initial maneuver to Baghdad to prepare for future operations. Neither V Corps nor 3 ID had a clear picture of the enemy and fought for details during 2/3 IDs two *thunder runs* into Baghdad. Perkins' objectives during the second thunder run focused on terrain rather than the enemy. The division's objective selection brought large numbers of enemy toward US forces. 3ID did not need to clear the city systematically. Using the urban infrastructure categories, the objectives were symbols of the Iraq regime and government buildings that were administrative services and cultural infrastructure. Both 3ID and 1 MAR DIV seized objectives in capital cities for operational purposes. The use of media provided the strategic messages.

In both cases, the size of the cities relative to the military forces available prevented a true isolation of either city in accordance with the doctrine of the day. These examples demonstrate a need to control the essential as mentioned in doctrine. The essential routes prior to entering the cities were the highways in both cases. Both became key terrain inside or just outside the DUE. On the Han River in Seoul, 7 ID and 1 MAR DIV removed most of the options available to the NKPA to escape or reinforce the city. In Baghdad, 3 ID seized most of the routes north, west, and south of their AO. Iraqi forces could not reinforce, escape, or clear 3 ID from their locations. Both cities represented operational goals and sent strategic messages to opposing forces about coalition capabilities.

In both case studies, coalition forces damaged the physical terrain and infrastructure during the fighting. Though the NKPA damaged Seoul during the initial fighting, UN forces from the two divisions caused significantly more damage with indirect fires, close air support, and systematic fighting in their attempts to retake the city from a determined enemy. Baghdad suffered much less damage as the US division fought Iraqi military units oriented on the highways entering the city and lightly defended significant symbols of the regime. As the Iraqi military failed and dissolved away, the 3 ID did not need to systematically clear the city. No two instances in history are the same, but there are continuities between these two case studies.

Significant Findings

A dense urban environment is more than the three components in the urban triad, it is a complex system that integrates the three components in multiple ways. It is difficult to separate infrastructure from the other two when it includes the physical site(s) and distribution systems, actual services (energy, water, and transportation) provided to the people, and the people who manage and repair it. The Baghdad and Seoul case studies demonstrate examples of the human and conceptual links between the three components of the triad.

Two examples of the multiple connections between infrastructure, physical locations, and the population provide possible reasons to update the urban triad to reflect the complexity. In Seoul after the liberation ceremony, police officers moved from Pusan to Seoul to relieve a volunteer force. Following operations in Baghdad after the looting began, one unit in 3 ID found the police station vandalized and had trouble locating the officers to man it. The electrical power surged and cut off the power in early April in Baghdad. Whether a complete blackout or not, it affected a large number of people in a city of that size. US forces would need to use all three aspects of the triad to repair or reinstate either infrastructure example.

1. Locate the infrastructure source.
2. Locate an employee who could determine the problem.
3. Locate the problem.
4. Locate someone able to repair the problem.

This example portrays the loose boundaries between the triad and how interconnected the triad should be and how the many possible relationships and nodes create the complex system. This seems like a tactical problem until it is a requirement across the entire city and stretches multiple divisions. This can become an operational problem if infrastructure is not quickly repaired and the flow to the city restored. Depending on the local government's infrastructure, the flow of a city may not change until the division plans for certain infrastructure or physical terrain to be repaired or rebuilt.

Divisions in the US Army will continue to fight in urban areas for several reasons. Outside of military analysis, the UN conveys the importance of urban areas regarding the migration of populations to existing urban areas. The UN found dense urban environments without the systems and integration to control growth and provide infrastructure may have internal issues which cause conflict within the city. If US military objectives are linked with the strategic objectives oriented enemy government and that government physical resides in a capital city, then these two distinct links converge in a possible DUE. In both cases, Seoul and Baghdad were both a capital city and an operational objective. The two case studies of Seoul and Baghdad are set fifty years apart and both draw the US military against an enemy defending a capital city.

The continuities and contingencies between these cases demonstrate how a DUE as a system contains similar characteristics with unique problems. US Army divisions may need to account for these types of details to improve major combat operations and the transition into follow-on, or simultaneous, stability operations.

Solutions for the Future

As US Army division staffs prepare to operate in dense urban environments in the future, staff members can consider new models when planning combat operations to support future stability requirements. Some considerations, like new subcategories of existing frameworks are small, and others provide different planning models to prepare for operations.

Previously, the monograph included a definition for a DUE as an urban area with more than 1,000 people per square mile and a total population of 500,000 or more, either permanent residents or commuters within the administrative city boundaries or within the urban areas around it.[141] This definition provided the environment expected in large cities up to and including megacities. It is not meant to add or replace the population size framework, but add clarity to the urban environment.

[141] Definition provided by author previously.

For staffs in the future to understand DUE, a framework should reflect the subdivision of the urban triad and how they blend together. The concept of the triad as current segments of a circle creates a metaphor that the parts can be separated. Figure 3, urban infrastructure categories, demonstrates some of subcategories within the triad. Further research in doctrine found other infrastructures within those components. The simplistic model of the triad separate from the categories removes the concept that urban areas are a complex system and a DUE compounds that complexity.

An approach from a systems perspective can help with the complexities of urban operations and transitioning to stability operations. The examples included in the Baghdad case study demonstrated a number of variables that operational and tactical planners can consider on a massive scale. Depending on the system, if the nodes increase, the connections increase as the system grows in size, redundancy, and mass to support further expansion or unforeseen events. Table 2 displays a framework that supports division considerations for major combat operations and stability operations in a DUE.

Table 2. Tactical Considerations in DUE

Pre-conflict Phase 0-II	Major Combat Operations Phase III	Immediate Transition Phase IV	Stability Phase Phase IV
Infrastructure (status, service) -energy -water -waste -waste water -transportation (services) -commerce -human services -admin services -cultural	Use of ERT with maneuver units 1. Support maneuver 2. Assess infrastructure for catastrophic implications 3. Survey infrastructure for future transition Use of maneuver units 1. Secure/retain catastrophic infrastructure 2. Secure/protect critical infrastructure 3. Secure infrastructure for future transition	Use of ERT with maneuver units 1. Find and locate priority infrastructure 2. Survey remaining infrastructure or newly located 3. Receive USACE and USAID to support stability 4. Support Human services to support stability and growth (See population and complex physical terrain to reestablish infrastructure)	Use of ERT with maneuver units 1. Survey remaining infrastructure or newly located Transfer responsibility to civilian agency
Complex physical man-made terrain -determine layout of city for future subordinate areas of operation -locate transportation choke points linked to population flow. - Locate structures (by priority) - Locate areas to avoid impacts on future stability (commercial district, residential areas, admin bldg.)	Secure physical sites and avoid damage to distribution systems energy, water, admin services (gov.) commerce, fuel, human services Assess physical buildings, distribution, transmission physical systems	Ensure order + reduce insecurity to allow… Contract local support for security for priority infrastructure	Rebuild physical sites and improve based on strategic objectives 1. Rebuild trans networks as necessary to support commerce 2. Rebuild governance by importance 3. Transition
Population- Determine formal and informal communities ID community leaders ID infrastructure connections	Manipulate flow of city Divert commercial, civilian traffic Shift HA away from known Areas operations Anticipate shifts in population movement	Allow flow in the city to return or establish Locate population with infrastructure experience to repair/operate priority infrastructure	Transfer responsibility to civilian agency or DOS
Determine in or out of DUE Determine impact of damage (catastrophic, critical, important, routine) Task organize ERTs based on anticipated infrastructure during maneuver		Assist human service to prepare future city growth/ repair	Transfer responsibility to civilian agency or DOS
ERT- Engineer Reconnaissance Team DUE- Dense Urban Environment Host Nation US/Coalition Inter-agency	SWEAT-MSO- Engineer Reconnaissance Framework (Sewage, water, electrical, academic, Trash- Medical, Public (Safety), Other (cultural, religious)		Priority Infrastructure Categories 1. Critical 2. Essential 3. Important 4. Routine

Source: Created by author.

Depending on the size of the DUE, it should contain an exceptionally large amount of infrastructure to support the population and flow into the city. In order to select locations to protect, avoid, or assume risk, a division commander should consider the prioritization of infrastructure based on its impact of non-support in a DUE. During this research, the author assigned categories based on the potential impact the infrastructure would have on the environment. Table 3 is a template for planners to consider future DUE and table 4 is an example based on the Baghdad case study in section 4.

Table 3. Infrastructure Prioritization for DUE Stability

Infrastructure Prioritization (version 3)				
Categorization (prioritization)	Critical (1)	Essential (2)	Important (3)	Routine (4)
Infrastructure importance based on impact on pre-conflict way of life				
Infrastructure considerations:	Nuclear Reactor, Levee, Locks, Dam, Hydro-electric power, energy-gas distribution, energy-vehicle fuel, cultural-religious, cultural-gathering, cultural-recreational, waste disposal, food, potable water, human services, administrative services, waste water, commerce, transportation (trains, air, water, buses, commercial transit), non-essential services, Nuclear Reactor, Levee, Locks, Hydro-electric power, energy-gas distribution, energy- vehicle fuel, cultural-religious, cultural-gathering, cultural-recreational, waste disposal, communications (telephone, cellular service, internet) WI-FI (commercial or civil)			

Source: Created by author.

In the Baghdad case study, had Iraqi forces destroyed the Haditha Dam, there may have been a catastrophic event which may have resulted in a large loss of life, damage to structures and infrastructure within the flood zone, removal of a source of energy for the city, and loss of drinking water from the reservoir. The author assigned prioritization from critical, essential, important, and other. Based on possible results from a destroyed dam, the author assigned a critical prioritization status.

Analysis of the DUE as a system can help design the priorities in this table. These tables provide context to the importance of looking beyond the urban triad during the planning. The commander will use discretion based on pre-conflict DUE systems and desired outcomes.

Table 4. Infrastructure Prioritization for DUE Stability (Baghdad)

Infrastructure Prioritization- (Baghdad Example)				
Categorization (prioritization)	Critical (1)	Essential (2)	Important (3)	Routine (4)
Infrastructure importance based on impact on pre-conflict way of life	Haditha Dam	Food Potable water Human services (police, fire, medical) Administrative services (government-local)	Waste water Commerce and Distribution Transportation nodes communications	Non-essential administrative Communications (telephone, cellular service, internet)
Infrastructure considerations:	Nuclear Reactor, Levee, Locks, Hydro-electric power, energy-gas distribution, energy- vehicle fuel, cultural-religious, cultural-gathering, cultural-recreational, waste disposal, communications (telephone, cellular service, internet)			

Source: Created by author.

The essential category would remove basic necessities from the people in the DUE. This category includes drinking water, energy-electricity, and administrative services. In the example, the administrative services are in the essential category based on the Baghdad case study.

Division planners already have a significant number of planning considerations, however, understanding the constant changes within and around a DUE remains important. DUE contain a large number of nodes and connections densely packed between the three categories in the urban triad. The integration of the government creates and maintains the environment. The US Army cannot realistically replicate complex man-made terrain, infrastructure, and population density in training. Future planners and commanders should prepare for the flow of this environment.

Appendix A
Urban Operations Doctrine

Table 5. Transformations of Urban Doctrine

Publication	Infrastructure	Physical Components	Population Sizes and Populace
FM 31-50 (1944)	strategic objectives- telephone, gas, railroad and other public utilities- in larger towns village itself in smaller towns p. 62	factories, parks, outskirts- isolated homes closer in- closely spaced homes center- blocks of dense homes p. 62	no reference to sizes friendly, hostile and mixed civilians depending on the area. Find spies p. 66-67
FM 31-50 (1952) CH1 (1952) CH 2 (1955)	no change to objectives p. 53 military control of essential utilities necessity p. 71	includes cellars, sewers, and subways p. 59	no reference no change to description p. 56
FM 31-50 (1964) CH1 (1967) CH2 (1970)	installations and facilities such as power and water stations, railroad yards, and key buildings which must remain intact, if possible, for subsequent use by the friendly forces and the civilian population p. 30 Location of public utilities. P. 34	outskirts (sparse houses, vacant lots, Residential center of city is commercial p. 28 larger and smaller towns are differentiated p. 33-34	
FM 90-10 (1979)	MP secure infrastructure (communication centers, government buildings, water and electrical supply sources, and sewer and subway systems) p. 4-7	dense residential-disorderly close orderly residential dispersed residential high rise Industry/transportation p. 1-3/1-4 strip areas (no size but built on LOCs) p. 1-2	village (< 3K) towns and small cities (3K- 100K) large city (100K or greater) civilians can siphone combat power need to provide essential may be hostile p. 1-10 non-comtatant section p. 5-5
FM 3-06 (2003)	infrastructure concerns addressed in greater depth p. 2-18 to 2-25 5 urban infrastructure categories p. 2-20	functional zones p. 2-9 to 2-12 strip area renamed a commercial ribbon terrain-society are linked by infrastructure p. 2-2	large city (100K or 1 million) metropolis (1 million - 10 million) megalopolis (10 million or more) p. 2-15 society concerns introduced including social hierarchy p. 2-13 to 2-18
FM 3-06 (2006)	6 urban infrastructure categories p. 2-19	redesignated functional areas no change to urban model.	no change
ATP 3-06 (2017)	Diagram change, but more supporting information p. 1-19	Urban Triad model adopted to reflect nesting with joint doctrine. Updaes Terrain-society link by infrastructure.	small villages of 3K to large cities of 100k and large cities 100k to 20 million p. 1-3 megacity included as 10 million or more (not formally defined) p. 1-16 less focus on population size
*This Table does not account for derivative doctrine which is subordinate to these manuals in the hierarchy. Examples include; FM 90-10.1, FM 3-06.11, ATTP 3-06.1			

Source: Created by author.

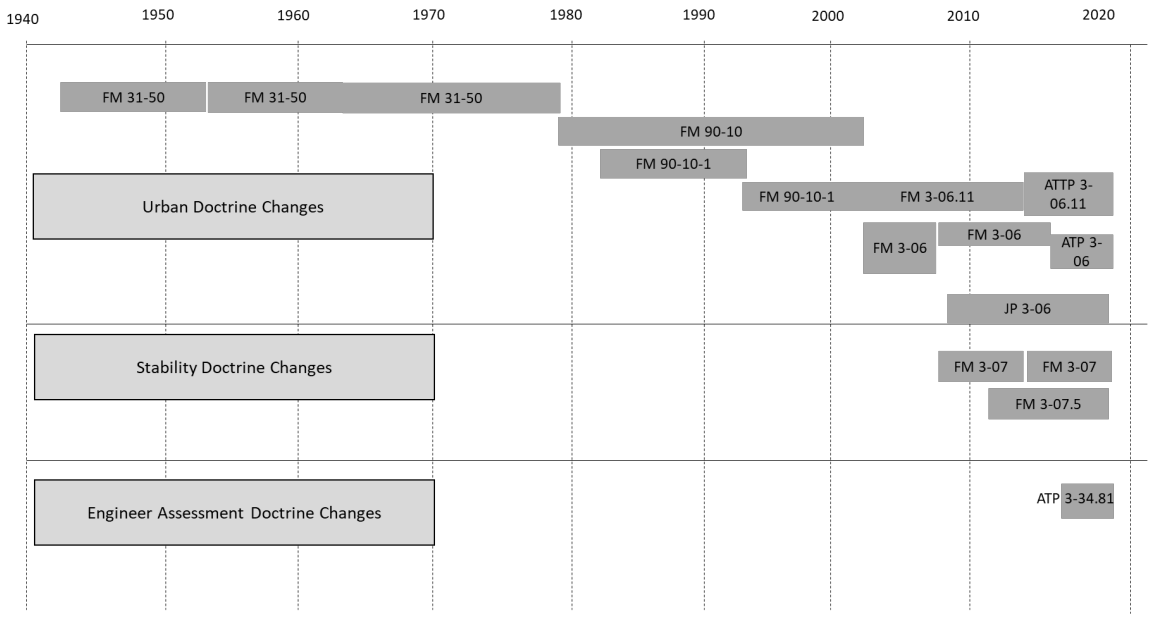

Figure 9. Timeline of US Army Urban and Complementary Doctrine. Created by Author.

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