GIVING NEW MEANING TO “MOUND CITY”
LANDFILLS AS A HISTORICAL NARRATIVE OF ST. LOUIS, MISSOURI

BY

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THESIS

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ABSTRACT

This thesis presents the position that waste management policies impact the physical urban fabric of a place, as well as its ecological environment, and cultural significance. It illustrates that landfills have shaped the built environment. Landscapes are often perceived as natural, though the reality is man has shaped many of them. The physical environment and how it changes is the result of the influence of our culture. A specific example of this is landfills, which are manipulated and manufactured landscapes at a large scale. Landfills are land use anomalies in the urban fabric.

This work is not about fixing or remediating landfills, but rather understanding why places exist the way they do by examining waste management policies. The St. Louis Metropolitan area is the focus area for the study to demonstrate the impact of waste management policies on landfills, and the built environment. Research was conducted on four existing landfill sites that each represent key factors in the built environment. The steps involved entailed the studying of federal and local waste management policies as an effect of landfills, showing a clear connection of the evolution of public policies being an integral role in the impact and outcome of landfills on the built environment. This pattern is supported by a series of inventory maps that illustrate the relationship of landfill development in the metropolitan area to the physical and ecological environment. Further investigation examined the relationships of individual landfills and their relationship to the physical, demographic, environmental, and cultural context.
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Chapter 1: Introduction

Landfills have evolved from primitive city dumps on the outskirts of town to sophisticated engineered systems. They exist as designed places, and the task of locating landfills as well as the continual management practices they demand, influences the built environment. However, these growing mounds of trash remain a blighted land use that is an anomaly in the urban fabric.

Estimates of an individual’s daily trash production continue to grow substantially, and it is essential to understand the parallels between waste management policies and the built environment. The United States Environmental Protection Agency has estimated that from 1980 to 2009 the amount of solid waste a person generates per day has increased from 3.66 pounds to 4.50 pounds (“Municipal Solid Waste Generation” 2009), and the amount of solid waste created per capita in the United States has doubled from 1960 to 1990 (Berger 2006, 186). This thesis explores the dynamic relationship between waste management policy and landfills, and the impact on the urban fabric as illustrated through the development of the St. Louis Metropolitan area. Landfills are a symbol of society and a cultural phenomenon not bounded by one place. As such, the St. Louis Metropolitan area serves as a microcosm for the exploration of the impacts of waste management policies on the built environment.

This thesis focuses on finding correlations between policy and form by examining four existing landfills. The framework used for understanding this relationship initially looked at landfill sites in a larger metropolitan area that encompassed St. Louis City County and St. Louis County, Missouri, and St. Clair County, Illinois. The area of study was reduced to St. Louis in St. Louis City County and East St. Louis in St. Clair County, in order to focus research on the city and obtain an understanding of context. This thesis looks at the entire system of the city,
demographics, zoning, ecological, historical, and cultural elements, while also looking at public policy. The four landfill sites were selected based on criteria of impact in order to look at policy’s correlation to the built environment. It examines the evolution of waste management policies as a means of understanding a broader shift in values and environmental consciences. It further examines the dynamic relationships between landfills and the physical, environmental, and cultural significance at the metropolitan scale, as well as over the “life” of each landfill. The method used here revolves around focusing on the impacts of waste management policy on an American metropolitan city’s built environment.

Focusing on the evolution and development of waste management policies in conjunction with the evolution of St. Louis’ physical, environmental, and cultural environment creates a historical narrative for the metropolitan area. This research shows a clear connection that waste management policies are an influential factor in shaping the urban fabric. Looking at policies provides a means to understand the monumental role landfills have in influencing the physical, demographic, environmental, and cultural components of a place. This thesis is not about what to do to fix or remediate landfills, but rather to understand how far management practices reach into our culture and shape the landscape. For example, despite the intentions of best environmental practices, the city has expanded the Milam Sanitary Landfill, in East St. Louis, into a wetland. An examination shows the operation of the landfill is a compromise between land planning and the ecological environment. Presenting the impacts of waste management policy on the various layers that comprise the built environment offers a model for viewing landfills as a form of urban development, and a narrative for the construct of the built environment. As designers landscape architects do not write policy, they influence it. This
document enables landscape architects to better understand the evolution of landfills and speculate on future environment impacts.

This document describes the result of the thesis, illustrating the impacts of waste management policies, and documents the research process. The following chapters introduce and examine the impacts waste management policy has on the physical, ecological, and cultural significance of a built environment. Chapter two explores the formation of a landscape by tracing the roles of policy and cultural values. Chapter three, “Landfill Development,” examines the relationship of the St. Louis City boundary and landfill development, as well as investigating the influence of federal and local policy on landfill development. The chapter culminates with presenting the St. Louis Metropolitan area as a system, examining the relationship between landfill locations and the physical, environmental, and cultural components of the landscape. Chapter 4, “Layers of Impact,” focuses on the impacts of waste management policy and landfills on the physical, environmental, cultural, and historical components within its context. The layers of impact are the components that have been altered as a result of waste management policy, showing a clear connection to landfills shaping the built environment.
Chapter 2: Literature Review

2.1: St. Louis as a Subject

St. Louis is located in eastern Missouri, along the western bank of the Mississippi River, and just south of the confluence of the Mississippi and Missouri Rivers. Before it was nicknamed “The Gateway To The West,” St. Louis was know as “Mound City” because of 26 man-made earthen-mounds that occupied the bluff tops of the Mississippi River’s western bank (Pauketat 1994, 67). Across the river, forty-five mounds occupied East St. Louis’ low-lying floodplain landscape. These mounds were part of a permanent settlement built by the Mississippian civilization, which was a culture that flourished from A.D. 700 to A.D. 1500 (Dickey 2011, 8). Between 1830 and 1880 the earthen mounds were destroyed, “What the plough did not level, the expanding city flattened and erased, or covered over” (Pauketat 1994, 67). The earthen mounds have been sacrificed for the development of the city.

Following Missouri’s inauguration as a state in 1820, St. Louis was incorporated as a city on December 9, 1822 ("Saint Louis, Missouri: City History and Historical Figures" 2012). Its location on the Mississippi River made it an important river city, transforming St. Louis into a commercial center and a boomtown ("St. Louis, Missouri - Gateway to the West” 2012). St. Louis’ development was not only supported by its location on a transportation break between north and south river traffic, but also due to its location as transportation break between east to west overland movement. The 19th century was a prosperous time for St. Louis, ranking it as one of the largest cities (Smith 1995).

Though St. Louis’ location is a prominent feature in its development, the local and state governments have played a key role in the urban fabric. In 1875 the state of Missouri enacted a new constitution that included an amendment allowing larger cities to govern themselves,
without the oversight of a county. Motivated by the prospect of greater economic prosperity, St. Louis chose to secede from St. Louis County in 1876. The city of St. Louis believed that the rural territories surrounding the city were a burden to the growth, development, and success of the city. Granting St. Louis independence from St. Louis County resulted in the permanent fixation of the city boundaries in their location at the time of their granted independence (Smith 1995). This enabled St. Louis to prosper economically, but its physical growth suffered the consequences. Many other cities have the options to expand their boundaries, often times leading to the annexation of land for development. Unable to expand the city boundary, St. Louis’s built environment is a landscape created from the adaptation of land uses and negotiation of public policy. St. Louis rose to prominence in the 19th Century, but has since experienced a drop in population that is not congruent with the rise in landfills.

2.2: Landfills as a Landscape Phenomenon

Following World War II, “Disposable products, food packaging, and the convenience, cleanliness, and labor savings they represented were understood to distinguish the freedom of modernity from the drudgery of old fashioned life” (Berger 2006, 41). Since then solid waste has been viewed as a sign of freedom and social progress. Simultaneously waste and landfills are a necessary outcome due to the relationship between mass production and mass consumption. As a result landfills are a cultural phenomenon and waste management policies embed them into the built environment. Americans perceive man-made elements that rupture the natural landscape as symbolic of the omnipotence of humanity, and the continual technical advancements of man-made elements represent the increasing power and ability to shape the human landscape (Nye 1994, 290). Landfills can be understood in precisely this way. Evolving
from primitive dumps on the outskirts of town to sophisticated engineered systems, landfills illustrate the increasing power of technicians. Landfills are land uses that are incorporated into the structure and function of the human landscape. They are a component that is a necessary piece of the urban fabric and its evolution. However, cities are consistently depicted through cultural centers, athletic activities, institutional buildings, physical geography, and ecological elements. Landfills, considered unsightly land uses, are always omitted and more often ignored, but they play a key role as a transitional landscape (Berger 2006, 28). This research shows clearly that waste management policies, through the effect of landfills, impact the physical, environmental, demographics and cultural layers of a place, altering and shaping it.

Landscapes are a culmination of societal ideals that respond to human process and needs (Spirn 1998, 22). The human landscape of America was created and has evolved through conflation of preservation and transformation of the natural world. This is characterized as, “The ability to consume the world as nothing more than a plenum of nutrients in that characteristically American project of self-making” (Nye 1994, 37). The human landscape is far from simple; it is a complex creation of integrated coexisting elements (Spirn 1998, 168). The built environment is not a static system; it is dynamic and influenced by continuous flows of influential factors (Berger 2006, 44). Landscapes represent a capacity to engage a society’s political ideals. As a result the landscape is not only a result of cultural values but also simultaneously an active instrument in shaping our modern culture (Corner 1999, 1).

2.3: Influence of Public Policy

America is a human landscape shaped by the values of individuals. This created landscape is described as an improved nature that exists due to fusion of work and process (Marx
The perception of improvement is based on cultural values. Since landscape change is continuous and unavoidable, local, state, and federal governments utilize policy as a means of management that enables the overcoming of limitations that could potentially hinder the effectiveness of managing landscape change (Montgomery 2011, 4). A human modified environment is described as a unique cultural landscape whose character emerges from both natural conditions and more largely management and policy practices (Hoyer 1999, 69). As values evolve public policy adapts, in turn continually “improving” the landscape through the effect of landfills that impact the built environment. This work shows the correlation of public policy and the narrative of the built environment of the American metropolitan city. Growing mounds of trash have become a cultural phenomenon. Their role in shaping the built environment is a direct result of management practices conducted through waste management policies. These growing mounds of trash are blighted land uses that have spurred debates centered on property equality versus the waste disposal needs of the population. Land use planners must balance providing quality housing, schools, and recreation with the equally important land use of solid waste disposal. Ultimately, responsibility falls upon those who formulate and employ municipal management practices, which in turn become influential factors in how landfills shape the built environment. A landscape is composed through the intersection, overlaying, and weaving of systems that create parallels and interaction among elements (Spiri 1998, 171). The complexity between systems formulates space that is not segmented but rather continuous, and so each element is contained within the larger whole and context. The landscape is, therefore, a successive system of interacting elements organized based on hierarchical relationships that create a nested structure (Spiri 1998, 173). The interaction and hierarchical organization of elements is demonstrated through policy, which has created a form of structure
within the American metropolitan city. Policy plays a guiding role in the American landscape, restricting and influencing the human landscape (Berger 2006, 27). Public policy influences various underlying systems that include the physical city, ecological environment, cultural significance, historical significance, and demographics. Waste management policies guide how landscapes are developed and evolve as an effect of landfills and their impact on the built environment. Landfills represent a landscape dependent activity that are an influential factor in increasing the complexity of the urban fabric. When a land use such as a landfill is included in an urban system it introduces complexity and intensifies the need for balance. Imposing order through zoning codes is a means of balancing the system (Berger 2006, 78).
Chapter 3: Landfill Development:

3.1: Relationship of the City Boundary and Landfill Development

Waste management policies reflect both an environmental consciousness and economic motivations. The notion that landscapes are shaped by policies is reiterated when the impact of waste management policy on a metropolitan landscape through the effect of landfills is considered. This can be initially illustrated by examining the relationship of the St. Louis City boundary and landfill development. The city boundary has remained in place since St. Louis City seceded from St. Louis County in 1876 (Smith 1995). While the boundary has remained static, landfills have developed both along and within it (fig. 1). This suggests that the shape and location of the city boundary for St. Louis does not influence the location of the landfills.

Understanding the relationship of the city boundary and landfill development is crucial to understanding the influence of landfills on the built environment. In 1970 there were 20,000 active landfills, both publicly and privately owned in the United States. That number drastically decreased to 6,000 at the end of the 1980s, and by 1999 there were 2,268 operating landfills (Berger 2006, 186). Though the quantity of operating landfills in the United States has decreased, the vastness of the active sites that do remain provide a total capacity of approximately 160 million tons of waste per year for four decades. The evolution and consolidation of landfills apparent in these statistics stems from waste management policies (Berger 2006, 186).
Figure 1 Examining the relationship between the city boundary of St. Louis and landfill development
3.2: Influence of Policy and Landfill Development

In order to completely grasp the influence of landfills on the built environment it is imperative to examine waste management policies. Figure 2 is a timeline that investigates waste management policies as an effect of landfills and their outcome on the built environment. Prior to passage of the Solid Waste Disposal Act by Congress in 1965, solid waste disposal practices did not address impacts on public health and environmental degradation (Solid Waste Management Program 2005, 4). The Solid Waste Disposal Act initiated a growing understanding of the repercussions of solid waste disposal practices, catalyzing a shift in cultural and social values in 1970. The emergence and growth of societal awareness of, and concerns about, the environment and the effects of waste disposal practices acted as the driving force behind waste management policies at the national and local level. Preceding the shift, the lack of waste management policies left Missouri and Illinois state governments with relatively no control over solid waste disposal. From 1940 to 1965, the Mississippi River was utilized as a sink, a convenience for disposal practices in the St. Louis Metropolitan region (Colton 1989, 108). The evolution of waste management policies plays an integral role in the impact and outcome of landfills on the built environment. While the shift represents a growing environmental consciousness, it is also accompanied by an increase in the number of public policies focused on waste management practices. Public policies implemented after 1970 have a more positive influence on ecology than those implemented prior to the shift. They are better than before, but not perfect. Landfills epitomize how the landscape is shaped to conform to the values and needs of society. Driven by society’s needs and values, waste management policy dictates landfill development. The needs and values of society are never static, influencing the continuous development and evolution of waste management policies. The continuous evolution
of public policies fuels their dynamic impact. Waste management policies are an effect of landfills, and the built environment is an outcome of the impact between public policy and landfills. Accessing the outcomes of waste management policies in a metropolitan area like St. Louis is useful for understanding the impacts of landfills on the built environment.
Figure 2 Timeline of federal, state, and local waste management policies, population data, and trash consumption trends
3.3: Relationship of Zoning Designation and Land Use

Land use guides society and negotiates a landscape of policy. The landscape is shaped by land uses, which are the results of public policies and practices. Public policy determines and guides infrastructure and the degree of intensity at which development occurs through the implementation of land uses that create the built environment’s pattern (Montgomery 2011, 1). Zoning is an example of how public policy is a direct factor in influencing land use, specifying what the land may be used for. Examining how land is used based on zoning designation is key in understanding the impacts of public policy on the built environment. Figure 3 explores the relationship of zoning designation and land use in the St. Louis Metropolitan area. A large portion of St. Louis’ Mississippi waterfront is zoned as unrestricted. According to the “St. Louis City Code Chapter 26.60” Unrestricted Districts allow for building and premises to be used for any purpose other than residential. Approved permitted conditional uses are “Garbage Dumping,” “Smelting or Refining Metals,” “Petroleum Refinery,” ”Stockyards,” “Salvage Storage,” “Acid Manufacture,” “Fuel Manufacture,” and “Fertilizer Manufacture (Board of Alderman 2009). The Mississippi River is a major feature in St. Louis Metropolitan area. With barges dotting the shoreline, the river has consistently served as an economic resource, but its scope expands beyond commerce. It is has the potential to be a dynamic amenity that plays a key role in ecologic environments and to provide a recreational and picturesque resource for residents in the area. The vibrancy and the positive amenities that the riverfront could offer are muted by public policy, which is evident in the waste disposal properties that flow along its shoreline and in its floodplains.
Figure 3 2010 Zoning for the St. Louis Metropolitan Area
3.4: The Relationship of Environmental Elements and Landfill Development

The St. Louis Metropolitan Region is situated at the confluence of various ecological systems and conditions. Dynamic interactions between the Mississippi River, topographical features, and vegetation cover have shaped the floodplain, created ecological habitats, and influenced the watersheds (fig. 4). The Mississippi River has scarred the St. Louis Metropolitan Region with traces of its existence, leaving fertile soils and flat land (Tocqueville 2004, 23). The Mississippi Valley in which the river runs its course has been poetically described as “The most magnificent place God ever prepared” (Tocqueville 2004, 24). The Mississippi River has created a landscape of fertile soils for man to inhabit, as well as a host of vibrant ecological habitats. Southwestern Illinois is described as the American Bottom, a 175 square-mile floodplain of the Mississippi River that contains wetlands (American Bottom Conservancy 2012). Examining the environmental features and contexts shows a correlation to the impact waste management policy. For example, East St. Louis’ Milam Sanitary Landfill and its expansion into wetland is a compromise between land planning and the ecological environment. The operation of the landfill occurs as a result of an arrangement with Waste Management, the corporation that manages the landfill, to pay a yearly fee of $1.5 million to the city. This economic trend will continue as a result of the North Milam landfill expansion. The yearly fee has doubled the quarterly payroll of city employees, and created a police pension plan and Waste Management has also provided the city with shuttle busses, police cars, fire trucks, garbage trucks, free trash pick up, a health clinic, and community center (Bogan 2012). As represented in zoning designation, public policy does not reflect the environmental value of the land. The St. Louis Metropolitan area reflects various environmental conditions that could be an ecological
amenity. These environmental features are highlighted to depict the lack of value waste management policy has for the ecological stability of the landscape.
Figure 4 Examines the location of landfills to significant environment and valuable ecological features.
3.5: The Relationship Between the Physical, Environmental, and Cultural Elements

The creation and evolution of the built environment is the response to the continually changing societal ideals, values, and needs (Spirn 1998, 22). As a creation that is not static, the landscape is composed of interacting elements that overlay one another as a complex system of relationships. The layering of systems creates a successive structure in which hierarchy defines the interaction of elements (Spirn 1998, 173). Public policy is a piece of the system that guides successive systems. Figure 5 is the examination of coexisting systems in the St. Louis Metropolitan area. Looking at the system of a city through land use, environmental, and cultural elements illustrates a landscape negotiated through policy. The dynamic relationships between components illustrates that waste management policies do not reflect the value of the land. In essence policy has missed the significance of the physical, environmental, and cultural qualities of the metropolitan area. Looking at the entire system of the city while also examining policy shows that the four landfills each represent key factors in the built environment. The sites were selected based on criteria of impact on the physical, environmental, and cultural elements in the St. Louis Metropolitan area.
The Relationship Between Elements

Overlaying the physical city with environmental components and cultural elements represents the relationship between elements. The dynamic relationships between components illustrate that waste management policies do not reflect the value of the landscape. Policies have missed the significance of the physical, environmental, and cultural qualities of the city. The landfill sites that have been chosen exemplify the significant relationship between the physical, environmental, and cultural elements in the St. Louis Metropolitan Region.

Figure 5 The relationship between landfills and the physical, environmental, and cultural elements in the metropolitan context.
Chapter 4: Layers of Impact

The landfills each represent key factors that impact waste management policy in the built environment. Examining the chosen landfill sites in the metropolitan area individually portrays the variation in the influence of public policy. Layers of impact were categorized as culture, history, demographics, and environment. The category of culture explores the dynamic impact between waste management policy, landfills, and culturally significant elements in the metropolitan area. As a landscape shaped by cultural values, the built environment is littered with elements of cultural significance. Continually evolving cultural and societal values illustrate how waste management policy has a compromising effect on cultural significance. The category of history refers to elements of historical significance that are part of societal history. This exploration delves into understanding policy as an effect of landfills and their influence on the value and identity of historical elements. The demographic category is the understanding of the impact between public policy, landfills, and the demographic composition in the context of the landfill. This research shows that public policy does not put landfills in low economic neighborhoods, but rather low economic areas occur due to policy locating a landfill in the neighborhood. Lastly, as a metropolitan region in the Mississippi River floodplain, there are a plethora of environmental factors that play a role in the built environment. The category explores the ecological abundance of the region and the relationship between its degradation and landfills. This relationship exemplifies how waste management policy has enabled landfills to impact the environment, showing a clear connection of policies to the shaping the urban fabric.
4.1: Milam Sanitary Landfill

The Milam Sanitary Landfill is located in the floodplain of the Mississippi River, known as the American Bottom (fig. 6). The landfill has been in existence since 1950 (Stage 2000). In 2008 the mound stood at an immense height of 170 feet. With an average intake of 2,800 tons of garbage per day, the Milam Sanitary Landfill is expected to reach capacity in 2013 when it stands 225 feet tall, the maximum height allowed by the United States Environmental Protection Agency (Bogan 2012). The Milam Sanitary Landfill has been choreographed by waste management policies, impacting the built environment of the St. Louis Metropolitan Region. The passing of the Illinois Refuse Act in 1965 permitted landfills in the state (Colton 1989, 108). This initiated a local attempt to standardize waste disposal practices and was further supported by the birth of the Environmental Protection Agency in 1970, and waste management policies at the federal and local level that followed (Lewis 1985). In 1979 the Environmental Protection Agency formulated a policy that developed sanitary landfill siting restrictions and performance standards. Among the six location restrictions addressed were 100-year floodplains and wetlands. In addition, it established standards for endangered species protection, groundwater protection, disease and vector control, and methane gas control. The policy was developed as a means to mitigate adverse environmental impacts sanitary landfills have on the environment. The Environmental Protection Agency’s restrictions and standards only serve as a framework for state governments. It provides the minimum standards for human and environmental health and allows individual state governments to formulate flexible municipal solid waste landfill standards (“Introduction to Municipal Solid Waste Disposal Facility Criteria” 2005, 2-3). Local government waste management policy allowed the Milam Sanitary landfill to be grandfathered in, exempting it from the Environmental Protection Agency’s standards. The continued operation
of the landfill was motivated by monetary compensation by Waste Management Company, the operators of the landfill, who pays a yearly fee of $1.5 million (Bogan 2012). As the landfill nears its maximum capacity the local government has approved a 180-acre expansion in the American Bottom (American Bottom Conservancy 2012). The approval of the expansion was swayed by the prospect of generating an additional one million dollars in fees for the city (Bogan 2012). The contradiction of a policy in essence is a policy in itself.

Waste management policy has resulted in negatively impacting the ecological vibrancy and cultural and historical significance of the American Bottom. That region has the potential to serve as a host for vibrant wetland habitats, but it is caught in competition with the impact of public policy. The diversity of wildlife species in Missouri and Illinois’ Mississippi River floodplain is seemingly unmatched by any other type of habitat in the states (“Wetland Improvements” 2012) (fig. 6). Not only does a wetland provide as a host for various wildlife habitats, it also provides a natural flood control, and a means for filtering pollutants. Locating a landfill in this environment reduces wetland habitat, compromises population stability for American Bottom wetland species, increases the risk for flooding, and decreases the amount of pollutants being filtered (Langmuir 2006). It is evident that locating the landfill in the American Bottom has compromised and put at risk the floodplain’s ecological environment. The approval of the North Milam expansion further illustrates that waste management policy directly impacts the environmental degradation of the American Bottom. The 220-acre expansion encompasses five wetland sites, totaling 18.4 acres of prime wetland that will be removed as a result of public policy (American Bottom Conservancy 2012; Patrick 2011). The expansion is also situated a mere quarter of a mile from Horseshoe Lake State Park, a prime landscape of preserved
American Bottom habitat that the landfill will disturb (Patrick 2011). The landfill is a compromise between land planning and the ecological environment.

Figure 6 Examines the impact of waste management policy as an effect of Milam Sanitary Landfill.

In addition to compromising the wetland habitat, waste management policy has placed the groundwater at risk. Situated beneath the floodplain of the American Bottom is a fine-grained alluvium deposit that is hydrologically connected to an underlying coarse sand and gravel
deposit (Grimley et al. 2007, 6). Located in the midst of this bedrock composition is the Milam Sanitary Landfill. The landfill sits on top of 120 feet of fine-grained alluvium, with the base of the mound below grade in comparison to the surrounding landscape. The fine-grained alluvium overlies artesian aquifers, which causes leaky artesian conditions. Such conditions create aquifers that lose or gain water from adjacent less permeable layers (Clark 1975, 329-330) (fig. 7). The interconnectivity of sand and gravel deposits creates a high risk for groundwater contamination in the American Bottom floodplain. It is a high-risk situation to have a permitted landfill in such conditions. Policy has impacted the quality of the groundwater conditions and the ecological habitats, as part of a “legal bribe” that has created a mound that symbolizes economic prosperity to the local officials. The local treasurer claims he does not smell soiled or rancid trash in the air, rather he says, "All I ever smell is money" (Bogan 2012).

![Diagrammatic section depicting Milam Sanitary Landfill](image)

**Figure 7** Diagrammatic section depicting Milam Sanitary Landfill

The Milam Sanitary Landfill also illustrates how public policy has impacted cultural and historical significance. The landfill is two miles to the west of a Cahokia Mounds (fig. 8). The preservation of the settlement is recognized as a State Historic Site, a United States National Historical Landmark, and a World Heritage site for its value and importance for understanding North America’s prehistory. The Cahokia settlement was inhabited from 700 to 1400 A.D., at which time over 120 earthen mounds were built. The remains of the Cahokia settlement
represents the most sophisticated prehistoric native settlement north of Mexico. Within the center of the Cahokia settlement is Monk’s Mound. This mound is the settlement’s ceremonial center, and the largest prehistoric man-made earthen mound in North America (“About Cahokia Mounds” 2008). Visible from the mound is Milam Landfill. Standing at 180 feet tall, the landfill dwarfs Monks Mound, degrading the significance of Cahokia (Stage 2000). Visitors to the settlement are often left wondering if that mound in the distance is part of the ancient civilization. Both mounds have been created through human development, but drastically differ from one another. With a base of 14 acres and standing at 100 feet tall it took prehistoric Native Americans 200 to 300 years to build monks mound. In a period of 40 years modern society has built an earthen mound that eclipses the prehistoric settlement (Stage 2000). The Milam Sanitary Landfill and the Cahokia Mounds are a juxtaposition of ancient and modern society.

![The Gateway Arch](image)

A beacon that stands tall, the Arch is an icon of western expansion. Today it is lost against the symbol of modern society.

![Landfill Degrades The Mounds](image)

Standing at 208 feet tall, the Milam Landfill dwarfs Monks Mound. It is a juxtaposition between the ancient and modern society.

Figure 8 The relationship between the Cahokia Mounds and Milam Sanitary Landfill

Waste management policy has played an integral role in shaping the ecological environment, and cultural and historical significance within the context of Milam Sanitary Landfill. Landfills are a necessity in the American society and where waste management policy chooses to site them has an evident impact on the built environment. Policy granting the
continual operation of Milam Sanitary landfill and the expansion of North Milam Landfill has resulted in impacting the American Bottom’s ecological vibrancy, and the cultural and historical significance of Cahokia Mounds. Waste management policy has dictated the “life” of Milam Sanitary Landfill, ultimately impacting the St. Louis Metropolitan area’s built environment, evident in the 176-acre landmark on the flat landscape of the Illinois plains.

4.2: City of St. Louis Demolition Landfill

The City of St. Louis Demolition Landfill is located on the banks of the Mississippi River in the North Riverfront neighborhood. The neighborhood occupies a large portion of the riverfront and is dominated by unrestricted zoning, which has left its imprint on the land uses that line the riverfront (fig. 9). The City of St. Louis Demolition Landfill was an active landfill from 1981 to 2009 (“St. Louis Demolition Landfill Methane Information” 2009). The riverfront’s fate has been sealed by public policy dictating the land uses that shaped the landscape, and compromised its environmental quality.
The City of St. Louis Demolition Landfill exemplifies the impact policy has on environmental degradation. Due to the decomposition of organic material, landfills generate various types of gases, which include trace gases, nitrogen, carbon dioxide, and methane. As a highly explosive colorless and odorless gas, methane production is a primary concern (Solid Waste Management Program 2009, 1). Landfills are the third largest source of human related methane emissions in the United States and methane is a greenhouse gas that is 21 more times potent than carbon dioxide (“Methane” 2011). Spurred by concerns for the effects methane has on the environment, the EPA amended a 1975 policy for landfill siting restrictions and standards to address facility design, corrective action measures, and closure and 30-year post closure care in 1991 (“Introduction to Municipal Solid Waste Disposal Facility Criteria” 2005, 1). Required monitoring of methane gas falls within this policy revision. To mitigate the potential of risk of high methane levels, the EPA requires the implementation of a methane-monitoring program to ensure gas concentration does not exceed 2.5 percent by volume in the soil of a facility’s...
boundary (9-10). Though the policy requires monitoring it gives state governments the responsibility of implementing a suitable program. The policy revisions outline performance standards for site-specific factors that permit local governments to establish site-specific constraints, allowing them to balance environmental protection and cost. This allows for significant flexibility for landfill location restrictions and operational standards, resulting in variance in the degree to which efforts are made in preventing environmental degradation (2).

The Missouri Department of Natural Resources utilized the EPA’s standards to guide and establish landfill operation standards for measuring methane gas concentration. While the EPA’s policy mandates that methane gas concentration at all landfills be routinely measured, it does not require the implementation of gas wells (McDowell 1998, 13). Gas concentration at older landfills is monitored by inspections that look for signs of increased methane concentration. Indicators of increased methane concentration include dead or distressed vegetation beyond the property boundary and gas bubbles in standing puddles (Solid Waste Management Program 2009, 1).

Permitted for use as a landfill in 1981, the City of St. Louis Demolition Landfill was built prior to the implementation of the current landfill operating requirements. Local public policy grandfathered the landfill, allowing it to continue to be operational and free from monitoring for methane gas. By exempting the landfill from abiding by the EPA’s 1991 policy standards it was discovered in 2009 that the landfill’s methane concentration level far exceeded 2.5 percent by volume in soil along the facility boundary (“St. Louis Demolition Landfill Methane Information” 2009) (fig. 10). To combat the problem gas wells have been installed along the landfill’s property boundary (Bungart 2009) (fig. 11). The wells have measured methane concentration ranging from 25 to 55 percent by volume. An accumulation of 5 to 15 percent by volume of
methane is a high explosion and fire risk. Methane detectors have been installed in homes within 1,000 feet of the landfill in addition to the installation of gas wells beyond the facility’s boundary (“St. Louis Demolition Landfill Methane Information” 2009) (fig. 12).

**Figure 10** Representation of the approved methane gas concentration and the actual concentration measured at the City of St. Louis Demolition Landfill

**Figure 11** Gas wells were implemented at the City of St. Louis Demolition Landfill after high methane levels were discovered
Figure 12 Due to the extremely high methane concentration gas wells are needed beyond the property limits of the landfill

Waste management policy’s action of sanctioning the City of St. Louis Demolition Landfill to continue operating in the absence of methane gas monitoring illustrates the lack of value policy has on the degree to which it impacts the natural environment. This shows that policy, as demonstrated by landfills, is a compromise between land planning and the environment. While the landfill was immediately forced to shut down, policy has and will continue to impact the condition of the environment due to the unimaginable high levels of
methane concentration. Ultimately, waste management policy has made an impact on environmental degradation that cannot be reversed.

**4.3: Chain of Rocks Demolition Landfill**

The Chain of Rocks Demolition Landfill is situated 80 feet above the Mississippi River, in the city of St. Louis’ Riverview Neighborhood (Hamilton 2010). Riverview is the narrowest and northernmost St. Louis neighborhood (Groth 2011) and, as a narrow piece of land wedged between the Mississippi River and St. Louis County, the Riverview neighborhood is a unique place. Its identity has derived from its cultural, historical, and environmental history and impacted by waste management policy. Waste management policy granted the Chain of Rocks Demolition Landfill to be located at the foot of the Old Chain of Rocks Bridge on the historical site of Route 66 (fig. 13). The landfill impacts cultural, historical, and environmental elements that are not bounded by the city.

**Figure 13** Examines the impact of waste management policy as an effect of Chain of Rocks Demolition Landfill
Route 66 is a cross section of American history. Other than Chicago and Los Angeles, St. Louis was the largest city along Route 66 ("Cruising Route 66" 2011). As a symbol of freedom and mobility, Route 66 is valued for its innovation. It represents a piece of history and culture for transportation. Valued for its embodiment of rich history and culture, 85% of Route 66 remains in tact. These 2,400 miles that stretch through two thirds of the United States are a link to and remnant of America’s past ("Route 66"). In the St. Louis Metropolitan area, Route 66’s significance has been lost as a consequence of waste management policy. Due to a lack of need, the Old Chain of Rocks Bridge was closed to automobile traffic and removed from Route 66. Public policy has created a missing link in Route 66, burying its historical and cultural value with the transformation of the site into a landfill. Today all that remains is a gravel lot scarred with fault lines caused by discarded demolished material that pushes from below (fig. 14).

**Figure 14** The landfill site has evolved from a Route 66 Toll to a barren lot

Public policy has not only severely impacted an integral piece of the city and nation’s history and culture, but also the region’s ecological stability. Public policy granting the use of the land as a landfill is also responsible for having an impact on the environment. The
Mississippi River is also known as the Mississippi Flyway, functioning as a migratory bird corridor for 60 percent of all North American bird species ("Mississippi Flyway" 2012) (fig. 15). The landfill sits along the banks of America’s largest migratory bird corridor (Floreth 2010).

Due to its land use, the Chain of Rocks Demolition Landfill no longer serves as a valued piece of the ecological environment. A landfill along the Mississippi River has devastating impacts on the flyway (Logan 2010). The vibrant wetlands, forests, and grasslands that the birds rely on for movement have been compromised. The Mississippi River at the Chain of Rocks Demolition Landfill has endured manipulation of the natural system as a result of waste management policy. Habitat that migratory birds rely on to move north to south has been manipulated, ultimately hindering the movement and species stability for birds and other wildlife. Policy manipulated migratory bird habitat, impacting the movement and stability of bird species.

Figure 15 The Chain of Rocks Demolition Landfill sits on the bank of the Mississippi River, greatly impacting the bird species that utilize the river as a flyway for migration.
Waste management policy has forever altered and impacted the cultural, historical, and ecological identity of the Riverview Neighborhood, St. Louis Metropolitan area, and the nation. Granting the use of a landfill has impacted the identity of elements that have shaped the built and natural environment, which extends beyond the boundaries of its immediate context.

4.4: Chain of Rocks Amusement Park Demolition Landfill

Once situated on top of a bluff overlooking the Mississippi River and the Old Chain of Rocks Bridge was the Chain of Rocks Amusement Park (“Chain of Rocks Amusement Park” 2008). Opened in 1927, the amusement park was situated on land adjacent to the Chain of Rocks Park. Established in 1918, that 40-acres park is St. Louis’ version of New York’s Central Park (Hinckley 2012, 57). Described as the most picturesque spot in St. Louis, the amusement park was situated on land that was proposed for the site of the 1904 St. Louis World’s Fair. Until it closed in 1977 the amusement park was a popular destination for both St. Louis residents and those who were just passing through (Cullins 2011). Like a beacon on the bluff, this “Funland Overlooking the Mississippi” captured the eyes of Route 66 travelers (Garner 2007, 118). Visitors often recall the moment of crossing the Old Chain of Rocks Bridge from Illinois to Missouri, stretching one’s neck “To see when I could spot the first sign of the amusement park on the bluff” (118). The Chain of Rocks Amusement Park was once an integral piece of life for residence that added vibrancy to the neighborhood, but now it is a distant memory. Buried beneath the ground are the dismantled structures, mechanical parts, and oil that comprised the amusement park rides. All that remains is the scar of Lookaway Drive, a roadway that once blended into the park grounds. Today it is a one way in and out road through a low-income area.
The road culminates at a public housing development situated on top of the buried remains of the amusement park (fig. 16).

**Figure 16** Examines the impact of waste management policy as an effect of Chain of Rocks Amusement Park Demolition Landfill

Waste management policy has had a great impact on the demographics of the neighborhood and the cultural significance of this place. By the 1970s it was a neighborhood in transition, already experiencing “white flight” (Logan 2011). Burying the amusement park on its former location increased the rate of transition. The impact of waste management policy to bury the park on top of the bluff sealed the demographic fate of the neighborhood. This is reflected in the city deeming it acceptable to build low-income housing on top of the closed demolition landfill (fig. 17). The amusement park, once a cultural icon of St. Louis, is now buried at the top of a bluff, forever impacting the identity of the neighborhood. The area is no longer remembered
for the amusement park, but rather as the portion of St. Louis that is perpetually a low-income area (Logan 2011). The identity once tied to the area is gone and forever forgotten.

**Figure 17** Relationship of demographics and the Chain of Rocks Amusement Park Demolition Landfill
Chapter 5: Summation

The built environment is shaped by cultural values. It is a human landscape that has emerged due to the utility of man equaling the utility of need. As a society, we need landfills, resulting in an instance in which utility of man equals utility of need. The creation and implementation of landfills as designed places, and particularly the tasks of locating and continually managing, influences the built environment. While they have evolved from primitive city dumps on the outskirts of town to sophisticated engineered systems, landfills have remained an anomaly in the urban fabric.

Presenting the impacts of waste management policy on the various layers of a city’s system creates a collective understanding of the built environment. The landfills each represent key factors in the built environment, illustrating the impacts of waste management policy on the culture, history, demographics, and environment of the built environment. This thesis traces a historical narrative that directly influenced the development of the St. Louis Metropolitan footprint. Landfills are a symbol of society and a cultural phenomenon. Exploring how far management practices reach into our culture and shape the landscape provides a correlation between waste management policy and the urban fabric of an American metropolitan city. This thesis provides a model for understanding and a way of viewing landfills as a form of urban development, while also providing a narrative for the construction of the built environment.

This thesis shows a clear connection between the impacts of waste management policy as an effect of landfills, and their outcome on the built environment. This document enables landscape architects to understand the evolution of landfills and the impacts on the built environment. Designers have begun only recently to view landfills as opportunities to transform landscapes. It is pertinent to see that these landscapes have always been designed places.
Landfills have consistently come into existence as a result of decisions being made. As designers, landscape architects serve people. Landscape architects do not write public policy; they influence it. The ability of landscape architects to understand the impacts of waste management policies and landfills can create a pivotal shift. This thesis provides landscape architects with the knowledge and ability to play an influential role in choreographing and transforming the built environment.
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