

A FAILURE OF MODERNISM

'Excavating' Pruitt-Igoe

Dr. Mark David Major, AICP, CNU-A
Savannah College of Art and Design
(904) 404-6138
mmajor@scad.edu

ABSTRACT

The paper investigates the Pruitt-Igoe Public Housing Complex in St. Louis, Missouri USA. A large literature implicates several factors in its decline, which public authorities famously demolished in 1972. Often, it cites design and planning as contributory factors without specifying how or why. Building on archival records and previous research, we analyse the 'spatial archaeology' of Pruitt-Igoe using space syntax. The purpose is to better understand how design and planning contributed to its social malaise. It concludes: 1) provision of space (i.e. quantity) became a liability as declining occupancy generated a 'broken interface' between adults and children; and, 2) the *pilotis* of the residential towers mediated formal access and spatial distribution in a layout characterised by 'intelligible dysfunction,' which facilitated opportunity and escape for criminal activities. Both fed the perception and reality of social malaise at Pruitt-Igoe.

KEYWORDS

design, Modernism, planning, public policy, social housing

1. INTRODUCTION

Pruitt-Igoe is a frequently cited example for the failures of Modernism (Newman, 1973; Jencks, 1977; Weisman, 1994; Hall, 2004; Ramroth, 2007). It was social housing constructed with 2,870 apartments for 13,000 people (228 people/acre or 565 people/hectare) in thirty-three 11-story buildings with a housing density of 50 dwelling units (du) per acre (125 du/hectare) on 57 acres (23 hectares) in north St. Louis, Missouri (**Figure 1**).¹ Demolished by the St. Louis Public Housing Authority (PHA) in 1972, controversy has swirled over the last half-century about several factors involved in the demise of Pruitt-Igoe. A succinct but bewildering list includes (in alphabetical order): architecture, construction, crime, demographics, design, economy, employment, familial sociology, maintenance, management, migration, planning, policing, policy, population, poverty, quality assurance, racism, regulations, suburbanisation, 'White

¹ Social or public housing is affordable housing constructed and managed by government (local, State or Federal in the USA) for the most economically vulnerable in society, i.e. lower- and lower-middle income. 'Housing project' or 'the projects' are American colloquial terms for social housing.

Flight', and zoning (Montgomery, 1985; Birmingham, 1998; Bristol, 1991; Freidrichs et al, 2011; *The Economist*, 2011).^{2,3}

At the same time, computing has enabled extensive mapping of social-economic data including types of crime, i.e. property burglary and vandalism, personal assault and robbery, etc. This led to a large literature about crime and the built environment in advancing our knowledge about social malaise, including space syntax research of post-war social housing (Newman, 1973, Hillier, 1986; Hanson and Hillier, 1987; Hillier, 1996; Shu and Hillier, 1998, Major et al, 1999; Ramroth, 2007; Hillier and Sahbaz, 2008). A key conclusion is the built environment cannot cause crime. It can only create the preconditions for where a crime might occur as statistical probability, not environmental determinism. Sometimes, it happens. Other times, it does not. The outcome depends on human action.



Figure 1: Pruitt-Igoe after 1963 but before 1972. The Vaughan Public Housing Complex (opened 1957-58) was the four branching structures in the foreground (Source: U.S. Geological Survey).

² 'White Flight' means large-scale migration of people of various European ancestries from racially mixed urban regions to more racially homogeneous suburban or exurban regions. The origins of the term in the mid-20th century are unclear. *Merriam-Webster Dictionary* cites first usage in 1967.

³ Euclidean and exclusionary zoning are the same thing. 'Euclidean zoning' is a term based on the 1926 U.S. Supreme Court decision in *Village of Euclid, Ohio v. Ambler Realty Co.*, which established zoning as a constitutional exercise of police power. The derivative association with Ancient Greek mathematician Euclid was an unfortunate coincidence, which imbued zoning with false connotations of scientific precision. Exclusionary zoning is the more accurate term.

When it comes to crime, people can blur perception and opportunity. Effective management and formal/natural policing can mediate to varying degrees. By natural policing, we mean 'eyes on the street' in everyday space use - people in movement and static use, front doors and porches, etc. - as defined by Jacobs (1961) and others (Hanson and Hillier, 1987; Whyte, 1988; Duany et al, 2000). Formal policing includes security guards, police patrols, closed-circuit television (CCTV) or video surveillance, and so forth. The former is more effective than the latter in prevention and resources (Jacobs, 1961; Gehl, 1971; Hanson and Hillier, 1987; Whyte, 1988). A leading indicator *and* reflective of social malaise, a perception might arise even if there is little evidence for particular crimes. Finally, perception and opportunity can sometimes merge to foster the most dangerous conditions. It does not always occur but 'worst-case scenarios' afflicted some post-war social housing. Generally, crime patterns (multiple incidents on average, not individual acts) occur based on three spatial variables: 1) less-used spaces quiet enough for a crime to occur undisturbed; but 2) possess enough people and things (such as dwellings) to ensure a reliable supply of targets; and, 3) proximate to high-used spaces to facilitate escape. In space syntax terms, this means somewhat segregated spaces somewhat near to integrated spaces but not necessarily adjacent in Cartesian terms. Hillier and Sahbaz (2008) also found residential burglaries related to the number of du/street segment – and, by implication, front doors – when controlling for the street network using space syntax. It is about the risk/reward nature of crime for opportunity, action, and escape. Another key discovery was evidence of a 'broken interface' between adults and children (2-to-1 or lower) characterised some spaces in post-war social housing. Modernist design and planning disrupted the typical ratio (12-to-1 or higher) found in traditional, street-oriented urbanism (Major et al, 1999). This was not an accident. Space was supposed to operate in this manner by creating protected green spaces and separating uses. Large numbers of unsupervised children (especially teenagers) perpetrated petty vandalism such as graffiti and broken lighting.⁴ Unused space became abused space. However, the perception of social malaise did not necessarily match reality. Most reported crimes were property vandalism, noise complaints, and domestic disputes (Major et al, 1999). This perception can exacerbate the situation. Fearing for personal safety, people minimise space use and further erode the ratio of adults-to-children. It may reach a 'tipping point' where perception becomes a self-

⁴ Disabled exterior and interior lighting becomes a frequent complaint of adults about personal safety.

fulfilling prophecy. Perception and opportunity merge to create the harshest conditions. Abused space becomes dangerous.

Did this happen at Pruitt-Igoe? There is suggestive evidence. Former residents seemed to describe three distinct spatial experiences:

- 1) Generally, positive about life inside the apartments, especially before 1968;
- 2) Initially, positive about the corridors/communal areas and negative about the stairwells/elevators in residential towers but both evolve into negatives with deferred maintenance/social malaise; and,
- 3) Largely silent about ground level, exterior spaces in the 1950s but overwhelmingly negative during the 1960s.

Their testimony indicates there were many unsupervised children in Pruitt-Igoe. They discuss developing their own code of conduct – frequently using the phrase ‘be a man’ – for life at the ground level. They noticed stark contrasts inside and outside of the project, even if only across the street (Freidrichs et al, 2011). The number of unsupervised children in the background of archival footage at Pruitt-Igoe is startling, especially during the 1960s (**Figure 2**).⁵ Collectively, this is circumstantial evidence for a broken interface between adults and children. Did the layout possess the traits necessary to generate such a broken interface? If so, why did it initially seem unimportant but later much more so to the residents?

Space syntax is well suited to answer such questions. However, no one seems to have analyzed Pruitt-Igoe over the last four decades. There are a few reasons.



Figure 2: Unsupervised children play on an abandoned car in Pruitt-Igoe during the late 1960s (Source: Freidrichs et al, 2011).

⁵ Even accounting for the attractor effect of cameras, i.e. adult photographers and cameramen departed but children remained behind at Pruitt-Igoe.

First, it no longer exists. By definition, investigating Pruitt-Igoe is an exercise in spatial archaeology. We can model but cannot validate using hard data in the form of numbers or graphs. We have to rely on soft data, which is human intelligence based on opinions, suggestions, and interpretations. There are archival records about its design, construction, management, and operation and the recorded testimony of former residents, public officials, and experts. This represents a deep reservoir of material for a forensic study. Nonetheless, any conclusions are speculative. Second, the logic of the layout seems apparent. Form and space composed at right angles in the parallel/perpendicular relationships of a regular grid. A problematic layout is not obvious so it is all-too-easy to casually dismiss planning as a factor. Third, any researcher is willingly wading into a distinctive American cesspool of racism and ideology sufficient to scare most people away, especially non-Americans. Perhaps it is unsurprising researchers have avoided the controversies of this particular project. Our purpose is straightforward. Can space syntax add anything of value to our knowledge about Pruitt-Igoe? The objective is: 1) precisely identify the physical factors, if any, which might have contributed to social malaise; and, 2) better link the physical and non-physical factors in telling its story.

2. BEFORE PRUITT-IGOE

Deformation of offset regular grids was the principal planning method in the St. Louis urban pattern before World War II (Major, 2015a). East-west rail lines initially fragmented the urban fabric into north and south St. Louis, later accentuated by other developments such as the interstate highways (**Figure 3**). St. Louis was the eighth most populous American city (856,796) in 1950. Like many, it experienced an influx of economically vulnerable populations to the city center from 1910-1970. Agriculture mechanisation led poorer (mostly Southern) Americans to migrate to manufacturing cities for employment opportunities. Black Americans escaping segregationist policies (i.e. separate but equal) in the American South were the most significant component in this Great Migration. By 1950, Whites composed 82% of the city population with many Blacks (17.9%) living in north St. Louis (Gordon, 2009).

Zoning became constitutional in 1926, which codified many Modernist principles. People quickly realised the financial windfalls of converting inexpensive agriculture tracts into valuable urban land uses at city peripheries, especially with road infrastructure catering to the

automobile. The 1949 National Housing Act and 1956 Federal-Aid Highway Act sped this process of suburbanisation begun by zoning with urban renewal policies in the former promoting 'slum clearing' and replacement with high-rise public housing.⁶ Cities (like St. Louis) could legally designate large swathes of urban fabric as obsolete or blighted districts to initiate eminent domain (i.e. compulsive purchases), demolish housing stock in

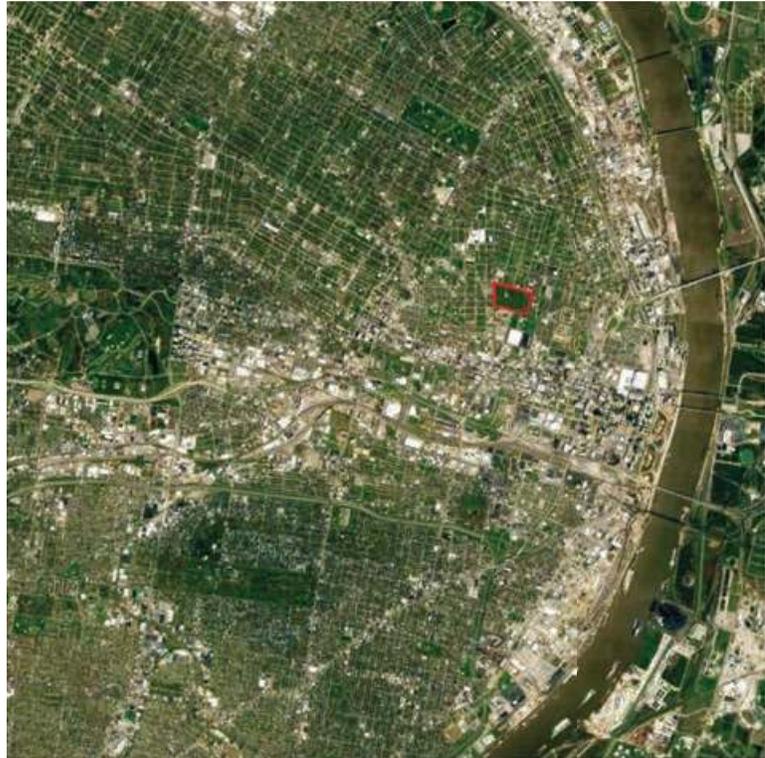


Figure 3: Satellite view from 15 km of St. Louis, 2016 with former Pruitt-Igoe site in north St. Louis outlined in red (Source: Google Earth, Landsat, and Copernicus).

older neighbourhoods, aggregate into larger lots, and secure Federal funding for projects like Pruitt-Igoe. Mortgage discrimination and restrictive covenants accentuated White Flight to the suburbs, excluding Blacks and others such as Jews and Catholics, i.e. Irish/Italian immigrants (Pulido, 2000; Thabit, 2003; Kruse, 2007).⁷ This left behind many Black Americans in city centers with falling population, an ever-dwindling tax base, and less employment opportunities, which followed and/or further enabled suburbanisation. This led to a distinctive pattern of racial segregation, which endures in St. Louis to this day.⁸

Like much of the city, 19th century tenements characterised the DeSoto-Carr neighbourhood in north St. Louis before Pruitt-Igoe.⁹ This housing deteriorated between the 1920s and 1940s. Owners ('slumlords') did not maintain their properties, profiteering on volume of rents. City

⁶ Simultaneously, financing mechanisms in the 1949 National Housing Act incentivised mass-produced housing developments in the suburbs.

⁷ Akin to 'business redlining,' which was/is the practice of denying services based on ethnicity.

⁸ See 2010 Racial Dots Maps of the Weldon Cooper Center for Public Service, Rector and Visitors at the University of Virginia (Dustin A. Cable, Creator): <https://demographics.virginia.edu/DotMap/index.html>.

⁹ A tenement is an attached, semi-detached, or detached multi-family residential dwelling where an owner holds the land and rents the dwelling and/or rooms to an end-user.

authorities failed to require basic property maintenance. The city decided to redevelop an inner ring of historic neighbourhoods including DeSoto-Carr to save downtown properties from a perceived imminent loss in value. Public authorities favored slum clearing and replacement with concentrated high-rise public housing. Some factors bring into question the justification for slum clearing at the time. First, density was not a distinguishing trait of Pruitt-Igoe. It was slightly higher than existing conditions, which only marginally represented a new opportunity for additional housing. Public authorities had to replace demolished tenements. Pruitt-Igoe's appeal was quality, not quantity. Second, there was similar housing in poor White neighbourhoods of south St. Louis. In the post-war period, property owners rehabilitated and gentrified many south St. Louis neighbourhoods into some of the most attractive places to live in the city. South St. Louis was also subject to slum clearing over the years. However, Black neighbourhoods in north St. Louis seemed to bear a disproportionate burden by comparison. Property owners and public authorities might have exaggerated tenement deterioration to access Federal funds. Third, public authorities constructed Pruitt-Igoe with Federal funds at a +/- \$36 million dollars (or \$12,500/du) cost in 1954. It is unclear what this cost included. Costs could have been higher, shuttled between different city, state, and Federal budgets. If exclusive to housing, then cost would be \$360 million (or \$125,000/du) in today's monetary terms. This cost/du is low (not impossible) to renovate a St. Louis tenement today. If we prescribe a more reasonable \$200,000/du cost, this would renovate 1,800 tenements, 69% of historic peak occupancy in 1957 or 78 more tenements than 60% occupancy at Pruitt-Igoe. These factors undercut urban renewal policies giving rise to slum clearing and Modernist public housing solutions. However, public authorities never seriously considered tenement rehabilitation or neighbourhood gentrification.

Cass Avenue ("Cass") to the north, North Jefferson Avenue ("N. Jefferson") to the west, Carr Avenue to the south and North 20th Street to the east bound the site (**Figure 4a**).¹⁰ Stronger interconnectivity to the east/south than north/west characterised streets in the future Pruitt-Igoe site in north St. Louis.¹¹ Before World War II, most employment opportunities were to the south and east at the Union Station rail yards and riverfront port/rail/warehouse facilities,

¹⁰ Inclusive of public buildings, ballfields, and the Vaughan Public Housing Complex.

¹¹ A 1933 U.S. Geological Survey map is the baseline for the space syntax model of north St. Louis. Information about alleyways - extensive in older residential areas of St. Louis - is unavailable. Typically, alleyways parallel public right-of-ways in St. Louis. They only tend to reinforce the pattern of the urban network using space syntax.

respectively. There is grid deformation west of N. Jefferson and grid expansion into the site from the east/south with offsetting north-south streets partway into the site and again at Cass.

Moderate to lowly integrated streets composed the site. Collectively, this makes sense. The northwest was the spatial 'heart' of the site, adjacent to the North Jefferson/Cass intersection. North Jefferson extends north-to-south from Hebert Street to Washington Avenue, continuing into south St. Louis along a different alignment. Cass extends east-to-west from near the riverfront to Grand Avenue. Cass was also part of State Highway 80 connecting further west to Page Boulevard. In the site, there were twelve north-south streets, two continuing further north and four to the south, and only four east-west streets, three continuing further east and only one to the west. All intersected at right angles except one short street at +/-twenty-seven degrees.

There were fifty-eight segments, all composing longer streets except three, which were short streets connected at both end and no cul-de-sacs. Based on a 1938 Sanborn map, there was a

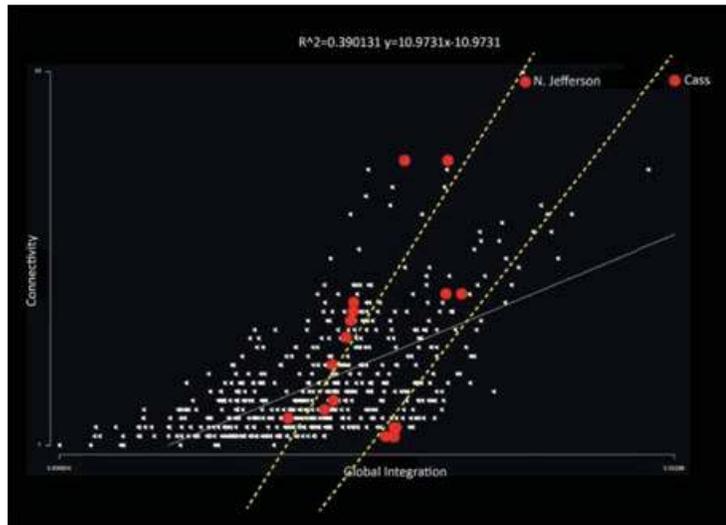


Figure 4: (above) Space syntax model of global integration in the future Pruitt-Igoe site (outlined in white); and, (below) intelligibility scatter indicating streets (red) and subsystems (yellow, dotted lines) of this site within north St. Louis, 1933. NOTE: Dotted lines are not correlation lines but for visual reference only.

minimum of 730 street-oriented dwelling entrances, probably more.¹² This was 12.6 dwelling entrances per street segment and 45.6 per street.¹³ Despite only 16 streets in a regular grid layout, there was a sophisticated spatial logic to this site (**Figure 4b**). Cass and N. Jefferson governed distinctive 'intelligible' subsystems characterising the relationship between connectivity and global integration, i.e. what you have access to immediately and further away.¹⁴ One was associated with N. Jefferson, Carr Avenue, and access to the east/south and the other with Cass/access to the north. There were intelligible relations in unconnected parallel streets, dependent on street length. This is elegant evidence of the regular grid's instrumental power to generate subtle differentiations in the urban spatial network, despite its strong prescriptive order (Pope, 1996; Major, 2015a). Public authorities intended Pruitt-Igoe as a symbol of post-war urban renewal and housing policies. They could have hardly chosen a more strategic, high profile site for that purpose. Due to its context, the site wants to be intelligible. It is difficult to make it unintelligible in space syntax terms. There is no evidence the architects or public authorities were attempting so. If anything, they underappreciated the spatial resilience of the site's contextual relations, overvaluing its symbolic power as a location at the expense of undervaluing its instrumental power in the north St. Louis urban pattern. In part, this is crucial for understanding what went wrong at Pruitt-Igoe.

3. DESIGN AND PLANNING FLAWS

The initial proposal for the site - high-rise, mid-rise, and street-oriented residential mix - was acceptable to city authorities. However, it exceeded Federal costs of the St. Louis PHA, which imposed a uniform 11-story building height. The approved Modernist design included separation of uses, stripped down aesthetics where 'form follows function' as advocated by American architect Louis Sullivan, building siting to free the ground level for green spaces, circulation (e.g. *pilotis*), and intrusion of natural light (Gropius, 1923; Corbusier, 1925).¹⁵ The site plan incorporated pre-existing St. Stanislaus Catholic Church/School along the eastern

¹² Sanborn maps show the building footprints. Only small lot, residential dwellings with minimal street setbacks are included in this estimate, which excludes vacant lots, alleyway-accessed buildings, residential dwellings with deep street setbacks, residential subdivisions in section, and large (probably non-residential) buildings.

¹³ These estimates cannot take into account the effect of vacant dwellings.

¹⁴ We use Intelligibility (global integration v. connectivity) due to fewer, longer, and more connected streets in American cities, which are shallower with less differentiation in terms of spatial depth than European cities (Major, 2015b). Intelligible subsystem means a subset of related routes, crossing over the correlation line into higher ranges of both measures, within the larger urban context.

¹⁵ A *pilotis* uses support piers, which raises the architectural volume, liberates the ground for circulation under the building, and provides a sense of floating/lightness in the architecture itself.

edge. Vaughan Public Housing Complex (opened 1957-58) was located adjacent to the southeast. The formal shape of the site and location of pre-existing roads/structures informed Pruitt-Igoe's planning.

Space syntax allows us to see pass the formal order of intrinsic qualities in a site (e.g. within the bounds) to better understand its extrinsic qualities (e.g. outward to the context) by relying on the minimal, most optimal lines of sight passing through every space until accounting for all potentials including bisecting/diagonalising across the plan. At Pruitt-Igoe, this included the *pilotis* passageways, which we have to reconstruct based on the paving plan and historic photographs.¹⁶ A *pilotis* at the base of each tower partially 'liberated' the ground level (approximately 50% visually anchored to the ground). There appeared to be two circulation routes via the *pilotis* per tower (**Figure 5** and refer to Figure 1). It provided access to tower interiors via stairwells and elevators: one elevator and three stairwells each, which split stairwell usage into separate wings. Dwelling entrances previously oriented to streets were elevated in section to the high-rise internal corridors. The threshold of these stairwells and elevators (132 in all) were the 'front doors' at Pruitt-Igoe; all oriented inward to the building, not outward to the public space. Of course, they were not front doors at all, effectively representing a complete elimination on the site. The Vaughan social housing also had 'cut-through' passageways at ground level. Building footprints and historical photographs make clear the location/operation of its 'cut-through' routes (refer to Figure 1). Crucially, they were separate (residents could avoid them) from access to the tower blocks, some of which endured until 2006. This



Figure 5: View of a residential tower *pilotis* at Pruitt-Igoe before demolition in 1972 (Source: Affordable Housing Institute).

¹⁶ Reconstructed on the following basis: 1) if it looked like a line of sight sneaked through, then it probably did since a line has no width in the real world, which consistently occurred at less than five degrees parallel to exterior walls; and, 2) ignoring changes in elevation due to landscaping, which there were a few examples but none too drastic.

was not the case for passageways in Pruitt-Igoe. At first glance, the spatial model appears akin to chaos (Figure 6a).

Generally, most people agree a design flaw in the high-rises was inclusion of 'skip-stop' elevators, which only provided access to the 1st, 4th, 7th, and 10th floors.¹⁷ Most residents had to use dark stairwells - primarily designed as fire exits - to access the floors of their apartment (Figure 6b). Former residents indicate these stairwells/elevators were a problem from the beginning (Freidrichs et al, 2011). In themselves, they were not the problem. It was the access to them facilitated by the ground level *pilotis*, which seems to have been uncontrolled and publically accessible. It mediated formal access and

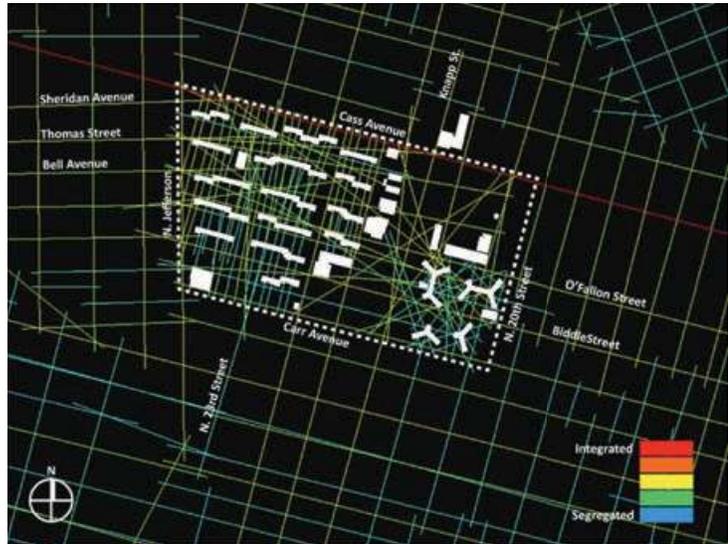


Figure 6: (above) Space syntax model of global integration for Pruitt-Igoe within north St. Louis, circa 1958; and, (below) Pruitt-Igoe stairwell, date unknown (Freidrichs et al, 2011).

spatial distribution from inside to outside and *vice versa*. Stairwell usage provided a small but reliable supply of victims in quiet spaces to commit a crime. The *pilotis* also provided access to multiple routes at ground level, which made it easy to 'disappear' in Pruitt-Igoe, especially as occupancy rates declined and damaged exterior lighting went unrepaired. Some people must have quickly realised and acted on this opportunity. Intensive patrols began soon after opening, even before any welfare recipients lived there. These security measures faltered as

¹⁷ 'Skip-stop' elevators use cantilevered floor plates to minimise floor area, which reduces cost for concrete pours and associated mechanical equipment. According to data cited by MIT, the total, all-inclusive costs of 'skip-stop' elevators are 30% lower than stopping on all floors.

conditions worsened during the 1960s. Emergency services effectively abandoned Pruitt-Igoe as too hostile of an environment due to residents venting their frustrations whenever these public servants did respond to a call. Criminal activity spread from the stairwells to elevators to communal galleries/corridors. According to Bristol (1991), “forced to walk through the galleries to reach their apartments, residents were threatened and attacked by gangs, who used these spaces as hangouts. Residents were also frequently attacked in the elevators.” This occurred even as some residents maintained their apartment interiors until St. Louis PHA began phased vacating of the premises in 1968 for demolition.

Planning also played a role. There were 92 distinct spatial routes in the layout, representing a 256% increase.¹⁸ This imbued a sophisticated ‘intelligible dysfunction’ to the spatial structure, layering multiple vulnerabilities for opportunity and escape in Pruitt-Igoe, which further implicates the *pilotis*. As before, there were two intelligible subsystems in the north and south, which is evidence for the spatial resilience of this strategic site in north St. Louis (**Figure 7**). However, N. Jefferson and Cass were no longer the most immediate, connected routes. The separation of pedestrians and vehicles designed in the site made these streets more globally integrated, distinguishing N. Jefferson and Cass as perimeter streets for moving vehicles in the spatial structure. Instead, the layout internalised and heightened connectivity within the tower blocks on diagonals/gridlines (or segments thereof) for pedestrians, parking, and green space. Critically, this meant N. Jefferson and Cass did not govern these intelligible subsystems. Internal diagonals from Cass Avenue to Thomas Street and the Vaughan social housing principally governed the northern subsystem. Thomas Street and N. Jefferson were in this subsystem, formally adjacent at its edge. The east-west gridlines from the riverfront passing through the Vaughan and Pruitt-Igoe social housing terminating at/near N. Jefferson principally governed the southern one. This internalized, heightened connectivity was important. The vertical scale of the tower blocks was dramatically different from the surrounding area. Most likely, they operated like ‘walls’ in the urban fabric due to scale in elevation and limited liberation of the ground level in plan. The *pilotis* afforded sufficient visibility to facilitate formal access (i.e. to stairwells/elevators) but insufficient visibility to facilitate surveillance of spatial distribution at ground level.

¹⁸ Inclusive of alleyways in the site based on the 1938 Sanborn Map, note #12.

These two intelligible subsystems accounted for every route in Pruitt-Igoe itself. Routes in the northern subsystem passed through, adjacent to, or terminated on 27 of the 33 (70%) residential towers. Routes in the southern subsystem did so for every residential tower. Nine large-scale diagonal and gridline routes passing through, terminating within, or on Vaughan tower blocks also facilitated access to every residential tower. These routes passed through Pruitt-Igoe, terminating at Cass (2) or N. Jefferson (7).¹⁹ Two routes passing through the northern housing areas but only tenuously connected into the southern subsystem are especially alarming. This

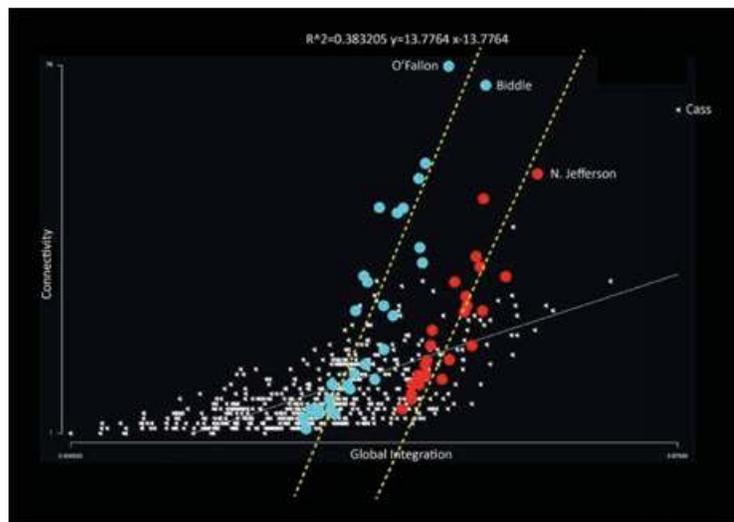
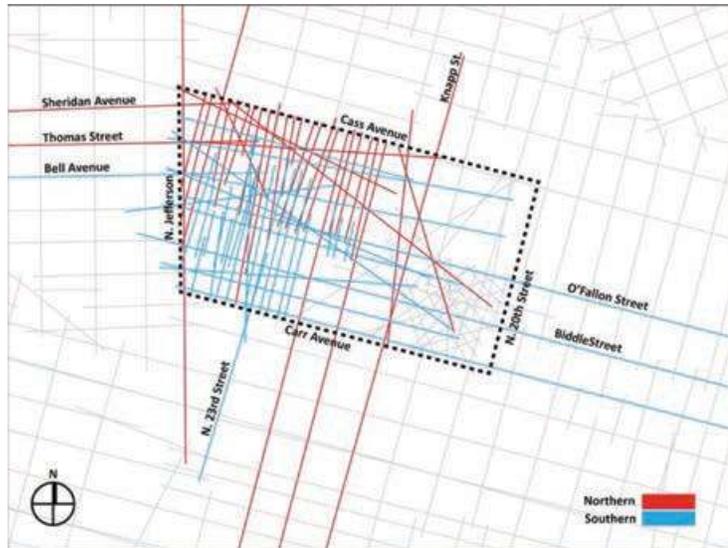


Figure 7: (above) Space syntax model and (below) intelligibility scatter indicating routes of the northern (red) and southern (blue) subsystems in Pruitt-Igoe within north St. Louis circa 1958. NOTE: Dotted yellow lines are not correlation lines, for visual reference only.

effectively demonstrates how the spatial structure (in particular, the *pilotis* passageways) generated an easy to read and use layout for formal access (opportunity) and spatial distribution (escape) in criminal activity throughout Pruitt-Igoe, especially from the south. On the other hand, it is perplexing how a well-connected, intelligible layout on such a strategic site could have generated a broken interface between adults and children when there seems abundant circumstantial evidence for such a broken interface based on soft data, e.g. resident testimony/archival footage. The most reasonable explanation is the layout did not generate

¹⁹ One exception terminated a block away at the intersection of Elliot Avenue and Gamble Street.

this broken interface; at least, not in terms of spatial structure. We have to look elsewhere for answers.

4. THE VALUE OF CO-PRESENCE

The best answer most consistent with available evidence, timeline, former resident testimony, and spatial analysis is declining occupancy generated the broken interface between adults and children. Occupancy peaked at 91% in 1957. Sources differ about how quickly depopulation occurred at Pruitt-Igoe. According to Ramroth (2007) and Newman (1973) respectively, occupancy was 67% in 1965 and, after a certain point, never rose above 60%. Eventually, spatial layout came into play as a dependent variable in terms of provision. There were too few adults and too many children for too much space. This further exposed the design and planning flaws in the layout for opportunity and escape in criminal activities, especially for the more expansive *and* segregated southern intelligible subsystem with multiple connections to the Vaughan social housing. This is why the ground level exterior spaces initially seemed unimportant in the 1950s but later more so to residents during the 1960s. It involves the innate value of co-presence in the built environment. Three factors seemed especially critical for Pruitt-Igoe. Two were 'baked-in' problems for which there is extensive research, i.e. racism and regulatory failures. The third seems overlooked, i.e. end of large-scale construction and opening of the Vaughan Public Housing Complex.

First, regulatory failures skewed demographics. Lower income families led by a work-age, unemployed male could not receive government assistance for public housing. Apparently, St. Louis PHA was flexible about these rules, advising low-income families how to circumvent them, i.e. husband left family so female-led household received assistance. This cut in half the adults in such households. Projected across multiple households, this significantly reduced adult males living at Pruitt-Igoe and negatively affected co-presence in spatial terms. The demographics only worsened as St. Louis PHA shuttled the most economically vulnerable populations - unable to secure placement in other public housing - into Pruitt-Igoe during the 1960s. Second, the December 7, 1955 Federal court order to desegregate St. Louis public housing undercut occupancy and maintenance at Pruitt-Igoe. It is impossible to envision (legally feasible and morally defensible) alternative scenarios at the time. This is the racism

problem: viable solutions require absence.²⁰ Black residents' testimony is consistent: Whites fled. This indicates two things: 1) Whites had more employment opportunities/housing choices to relocate elsewhere;²¹ and, 2) they were probably the most reliable rental income source for the St. Louis PHA, which funded maintenance. This income loss ended effective maintenance, which was 'behind the curve' from the very beginning at Pruitt-Igoe.²² Most people cite maintenance as a significant factor in its decline. It is understandable. Thousands of high-rise residential buildings around the world - public and private, Modernist or not - succeed, in part, because of strong management policies and consistent maintenance of buildings/grounds. Third, construction ended with Pruitt Elementary School and Vaughan opening circa 1957-58. It is impossible to pin down construction schedules to specific weeks, months, or even a year seven decades later with precision. However, construction work on Pruitt-Igoe residential towers continued 1-2 years after opening. It is feasible construction for all public buildings continued on site and/or the immediate vicinity until the beginning of 1958, even 1959. The early success and peak occupancy appears to coincide with these 5-7 years of construction. This is intriguing for a few reasons. The constant daytime presence of male construction crews (who were supposed to be there) may have initially aided maintenance and natural policing of space. Some residents may have also benefited from direct or indirect employment opportunities. It is hardly definitive but problems seemed to gather pace after construction ended in the area.²³

Occupancy declined, construction ended, the number of adults (especially males) who belonged there declined, and the proportion of children in female-led households increased over time. Unsupervised children participated in petty vandalism, i.e. graffiti, damaged lighting, etc. There is ample photographic evidence of graffiti. The forthright testimony of former residents growing up as children in Pruitt-Igoe ("we did some crazy things") makes clear the elevators, stairwells, and light fixtures were frequent targets (Freidrichs et al, 2011).

²⁰ St. Louis Post-Dispatch heralded Pruitt-Igoe as the "first integrated public housing" for lower- and lower-middle class families in the city. This was a misleading reference to the site, not the housing. Black residents lived in the Pruitt Homes and White residents in the Igoe Homes.

²¹ Affordable housing became increasingly available in the city as White Flight to the suburbs gathered pace during the 1950s. From 1950 to 1960, city population decreased by 12.5%. By 1970s, it decreased another 17%.

²² St. Louis PHA premised its maintenance budget and schedule on 100% occupancy at Pruitt-Igoe, which represents an astounding failure of best management practices, even gross negligence on their part.

²³ We are not suggesting city authorities could have simply 'built their way out' of the eventual problems at Pruitt-Igoe. Even if they had attempted such a thing, any fringe benefits for Pruitt-Igoe or its residents would have gradually disappeared as construction sites shifted further and further away.

White residents fled, leading to rental income loss and more deferred maintenance. The perception of social malaise began to feed a vicious cycle. Fearful for their safety, adults (especially females) limited space use to the interior of buildings (e.g. apartments, corridors/communal areas) and into/out movement from the residential towers/housing project to the surroundings (e.g. stairwells/elevators, perimeter streets). Absent parents - 'disappeared' males, employed or apartment-bound females - led to more unsupervised children at ground level. The former residents are especially informative in this regard. People with nefarious intentions in Pruitt-Igoe frequently paid unsupervised children to serve as lookouts during their activities. There were always many males who did not live or belong there, i.e. 'stranger danger.' These males came from outside the community to prey on residents, especially economically vulnerable females. In this sense, the opening of the Vaughan social housing is troubling. Nine large-scale diagonals/gridlines - some via 'cut-through' passageways - associated with its layout were part of intelligible subsystems in Pruitt-Igoe, facilitating opportunity in formal access and escape in spatial distribution within its housing areas, especially to/from the south. Pruitt-Igoe and Vaughan had an asymmetrical relationship (i.e. unequal) in formal access, vertical scale, and horizontal area. Criminals do not tend to work where they live. They export their activities to nearby housing areas. There is insufficient circumstantial or tangible evidence to explicitly implicate the Vaughan public housing in Pruitt-Igoe's social malaise. However, the spatial analysis is suggestive. Metaphorically, if the Modernist architectural and planning flaws of the *pilotis* was the 'kindling' for criminal activity, then declining occupancy, deferred maintenance, and the Vaughan social housing might have been the 'spark' to set Pruitt-Igoe aflame.

5. CONCLUSION

Pruitt-Igoe was a failure implicating many facets of our Modern world: culture, design, institutions, policy, management, and planning. The built environment and co-presence (i.e. space and people) are the factors best able to anchor several issues surrounding Pruitt-Igoe in the real, physical world. Racism was an intractable problem at the time, which fed into regulatory failures undercutting co-presence and maintenance at Pruitt-Igoe. This increasingly exposed design and planning flaws in the built environment. We were limited to inferring a great deal based on archival records/resident testimony. Nonetheless, the circumstantial evidence and spatial analysis is compelling. Spatial layout was a contributory factor in the

social malaise at Pruitt-Igoe. The provision of space (i.e. quantity) became a liability as declining occupancy generated a broken interface between adults and children. Intelligible dysfunction facilitated opportunity and escape in criminal activities. The lesson for design and planning is simple one. Too much of a good thing (abundant, intelligible space) under the wrong circumstances can create the preconditions for much bigger problems.

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Dr. Mark David Major, AICP, CNU-A
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