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**Humanizing Affordable Housing:
A Public Health Centered Approach to Affordable Housing**

By Eiman Mohamed

A Master's Thesis presented to
The Graduate School of Architecture & Urban Design
in Washington University in St. Louis in partial fulfillment of the
requirements for the Master of Science in Architectural Studies degree

May 1st, 2024

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Introduction

This thesis focuses on exploring housing as a determinant of health; thus, I aim to investigate the historical and current influence of housing design and city planning on occupant health and population health in metropolitan cities. The thesis will primarily examine how housing affects the health of low-income individuals. Historically and presently, this demographic has been disproportionately affected by health issues stemming from overcrowding, substandard housing design, declining neighborhood conditions, and environmental inequities. The goal is to discern the dimensions and standards for healthy housing against which designers and planners can define health outcomes. By acknowledging the factors that influence healthy housing, designers can establish inclusive conditions early in the project planning phase that support individuals in living and maintaining healthy lifestyles.

Chapter 1 begins with exploring the earliest catastrophic complications housing quality can have on public health by examining the correlation between housing density and rapid urbanization in 18th and 19th century industrial Manchester, United Kingdom, and New York City. The chapter will investigate some of the prevalent types of industrial working-class housing at the time — such as workshop dwellings, cellar dwellings, back to backs and tenements — and their impact on the health of working-class individuals prior to the enactment of housing reform policies at the turn of the century. This will be analyzed through studying aspects of housing quality that are internal to the property such as square footage, ceiling heights, the availability of operable windows to allow for ventilation, sanitation concerns, and access to sunlight and exterior space such as communal or private gardens. Chapter 1 will examine the conditions of the working class in Manchester and New York city to discover the relationship between growing population density and lack of adequate housing, and their effects on public health.

Chapter 2 will trace the response by planners and architects to mitigate the severe health repercussions resulting from the living conditions of the working class in industrial cities. As a result, Ebenezer Howard presented the idea of Garden Cities in the early 20th century. The Garden City Movement aimed to capture the primary benefits of the countryside and the city while avoiding the disadvantages presented by urbanization. Chapter 2 will analyze the first garden city, Letchworth, and its impact on community health. It will explore the movement's initial advantages and subsequent challenges, particularly its inability to accommodate the influx of post-war immigrants and growing population density without becoming prohibitively expensive for its intended beneficiaries — unskilled laborers seeking improved living conditions and migrating from industrial urban areas. This raises critical issues concerning housing security, affordability, and health that remain relevant today.

Chapter 3 synthesizes the analyses in Chapter 1 and Chapter 2 to present the dimensions of healthy housing. The chapter will present current medical and public health research about the effect housing can have on the health of urban dwellers. The chapter will investigate the factors contributing to health disparities between cities, examining how structural and social elements impact health outcomes. Specifically, it will explore why residents of disadvantaged neighborhoods, including low-income individuals and people of color, experience declining health levels. Furthermore, the chapter will explore how environmental injustices prevalent in disadvantaged neighborhoods can impact community well-being. The four dimensions of healthy housing analyzed in this chapter — stability, quality and safety, affordability and accessibility, neighborhood environment — will serve as key points of exploration to assess the success or failure of the case studies presented in Chapter 4.

Chapter 4 will analyze two contemporary case studies using the perspectives gained from Chapter 3 around the dimensions of healthy housing. Each case study examines health in affordable housing on a different scale, with the first case study being Via Verde in New York City to further understand the micro, internal conditions that promote the health of low-income individuals. The information on Via Verde in this chapter was collected from an interview with William Stein, the principal architect of Via Verde at Dattner Architects. The second case study observes the positive effects of healthy housing on the macro scale by presenting Mariposa District Redevelopment Masterplan in Denver, Colorado. These case studies use the dimensions of healthy housing to address or reduce the structural, social, and environmental stressors that impact the health of urban residents.

Chapter 1: 19th Century Industrialization & The Impact on Urban Health

The industrial revolution marked the transition into the modern age characterized by a shift from an agricultural economy to machine manufacturing¹, paving the way for new transportation technologies and revolutionizing heavy industries like ironworking.² With industrialization, cities evolved to adjust for the influx of residents moving from rural towns as the workplace changed from farms and shops to the factory. However, the developments in science and technology during the industrial revolution didn't extend to living conditions and public health, and as urban populations grew, cities were falling behind on sanitation and hygiene policies which facilitated the spread of epidemics.³ Despite the rising availability of factory jobs and wages by 50% from 1760 to 1860, the housing quality in England severely declined due to cities' inability to cope with the growing urban density and accommodate the influx of workers migrating from rural towns.⁴ Additionally, cramped living conditions with inadequate modes of ventilation and inaccessibility to sunlight within residential properties were increasing the risks of respiratory diseases such as tuberculosis and vitamin D deficiency, while air pollution from the combustion of fossil fuels in factories along with contaminated drinking water from poor waste management practices contributed to unprecedented stagnant health levels in the 1850s.⁵ Segregation of housing also contributed to poor community health, as the middle class were more likely to live in better quality housing with access to clean public amenities whereas the less skilled middle class and immigrant populations were cramped in over-capacity

¹ "Industrial Revolution", Britannica, accessed February 8, 2024, <https://www.britannica.com/money/Industrial-Revolution>.

² Raymon Huston, "7.1 the Industrial Revolution," *People Places and Cultures* (2020).

³ Gillian Crane-Kramer and Jo Buckberry, "Changes in Health with the Rise of Industry," *International Journal of Paleopathology* (2023).

⁴ Gregory Clark, "Shelter from the Storm: Housing and the Industrial Revolution, 1550-1909." *The Journal of Economic History* 62, no. 2 (2002): 489.

⁵ Daniel Gallardo-Albarrán, Herman de Jong, "Optimism or pessimism? A composite view on English living standards during the Industrial Revolution" *European Review of Economic History* 25, no.2 (2021): 2.

apartments.⁶ This phenomenon of concentrating poor, working class populations in unhealthy living conditions was termed as the Urban Health Penalty and can be observed in multiple major European and American cities during the 18th and 19th century. Industrial working-class housing can first be seen in major English cities where industrialism boomed, such as London, Manchester, Sheffield and York. Industrial housing types such as court houses, workshop dwellings, blind-backs, back-to-backs, and through-houses were important to factory owners as they provided accommodations within walking distance to factories and were low-cost enough that poor, working class laborers can afford to rent them.⁷ These structures often lacked proper supervision during construction, resulting in narrow entryways that rarely allowed in natural light, as well as being constructed out of cheap materials that often contained toxic materials.⁸ This was especially more prevalent towards the end of the war when building materials such as timber were costly but housing demand continued to increase as immigrants flooded English and American cities.

The first chapter will investigate the earliest relationship between housing quality in crowded cities and public health in the 18th and 19th century. This will be conducted through an analysis of the types of industrial working-class housing in Manchester and New York City. When discussing housing quality in industrial cities, the first chapter will primarily focus on aspects of quality that are internal to the property such as square footage, ceiling heights, the availability of operable windows, the number of toilets, and access to gardens and how that affects the health and wellbeing of urban dwellers. Manchester was chosen as a case study because of its unprecedented population

⁶ Eric Hopkins, "Working-class Housing in Birmingham During the Industrial Revolution." *International Review of Social History* 31, no. 1 (1986): 80.

⁷ Michael Nevell, "Living in the Industrial City: Housing Quality, Land Ownership and the Archaeological Evidence from Industrial Manchester, 1740-1850." *International Journal of Historical Archaeology* 15, no. 4 (2011): 604.

⁸ Eric Hopkins, "Working-class Housing in Birmingham During the Industrial Revolution." *International Review of Social History* 31, no. 1 (1986): 83.

growth during industrialization, where the city grew in size from 75,281 residents to 126,066 in 1821, and then doubled again in 1851.⁹ Consequently, there was a noticeable surge in the number of housing units, growing from 3,446 to 17,257 units. By 1851, this figure had skyrocketed to nearly 50,000 houses (Figure 1).¹⁰ On the other hand, New York city was chosen as a case study because of its housing reform laws in response to the spread of oppressive tenements in the 19th century. The analysis will use Jacob Riis' book, *How The Other Half Lives*, as a primary source due to its extensive documentation of the unhealthy living conditions experienced by immigrants in the Lower East Side tenements.

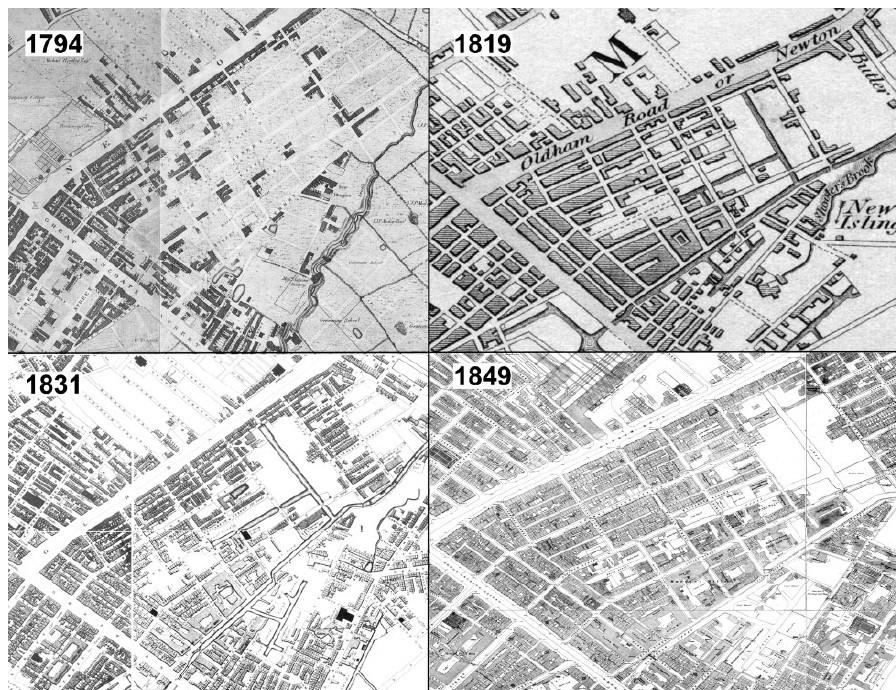


Figure 1: The growing urban density of Ancoats, Manchester. The maps were originally created and published in 1794; Johnson's map of Manchester, published 1819; Bancks' map of Manchester, published in 1831; and the Ordnance Survey 60-inch survey map of Manchester, sheet 24, published in 1849. (Nevell, 2014, page 53).

⁹ Clare Hartwell, *Pevsner Architectural Guides: Manchester* (London: Penguin, 2001).

¹⁰ Alan J. Kidd, *Manchester* (Edinburgh: Edinburgh University Press, 2002).

1.1 Industrial Housing Types in Manchester, United Kingdom

To understand the evolution of industrial working-class housing types in Manchester, a thorough understanding of the booming cotton and textiles industry is required. Before the transition towards factory manufacturing, proto-industrialization of textile goods in Manchester amounted to 51% of the total exports from Britain,¹¹ making Manchester the largest textile manufacturer city in the world by 1780.¹² Textile manufacturing was a lucrative business and attracted multiple Middle Eastern, German and Irish immigrants. Almost all hand-skilled laborers and weavers in the textile industry resided in workshop dwellings, properties built between 1740 and 1800 that were used as housing and workspaces. The largest cluster of workshop dwellings accommodating working-class laborers in the textile industry was situated in Manchester's St. Paul's district, which is currently recognized as the Northern Quarter.¹³ By the end of the 18th century, the Ancoats – north-east to the Northern Quarter – became the new industrial hub for factory mill work because of the textile industry's transition from hand-spinning to steam-powered factory spinning (Figure 2). This transition gave rise to new housing types to accommodate the influx of immigrants and rural workers moving into the Ancoats. Workshop dwellings were no longer needed as mill work moved out of the home and into the factory. To build housing density, new housing types such as back -to-backs, cellar dwellings, and court houses were developed through the addition or subdivision of already existing workshop dwellings. However, as housing density grew and with few building laws to protect

¹¹ Ian Douglas, Rob Hodgson and Nigel Lawson, "Industry Environment and Health through 200 Years in Manchester." *Ecological Economics* (2002): 237.

¹² Michael Nevell, "Excavating 'Hell Upon Earth' Towards a Research Framework for the Archaeological Investigation of Workers' Housing: Case Studies from Manchester UK." *Industrial Archaeology Review* (2017): 87.

¹³ Michael Nevell, "Living in the Industrial City: Housing Quality, Land Ownership and the Archaeological Evidence from Industrial Manchester, 1740-1850." *International Journal of Historical Archaeology* 15, no. 4 (2011): 597.

the welfare of tenants and prohibit fragmented land sale patterns to speculative landowners,¹⁴ a considerable decline in working-class housing quality was documented between the late 18th century and mid-19th century.¹⁵ According to Fredrich Engels, author of *The Condition of the Working Class in England*, and heir to a prominent textile family industry, the most blighted, overcrowded, and disease-ridden, substandard housing in Manchester can be found in Ancoats, Little Ireland and Angel Meadow, areas concentrated with court houses, back-to-backs, and cellar dwellings.¹⁶ This unplanned residential development to accommodate a growing urban population resulted in varied urban housing forms and uncovered the connection between deteriorating health and poor housing quality, especially when the spread of diseases and mortality rates increased in 19th century Ancoats, Manchester.¹⁷ This section of the first chapter will outline the various ways in which industrial working-class housing evolved in Manchester; initially through the subdivision of existing workshop dwellings, followed by addition and backyard infilling resulting in courtyard housing, and finally, the construction of new back-to-back and cellar dwellings.

¹⁴ Simon Taylor, Julian Holder, *Manchester's Northern Quarter: The Greatest Meer Village* (Swindon: English Heritage, 2008), 26.

¹⁵ Michael Nevell, "Living in the Industrial City: Housing Quality, Land Ownership and the Archaeological Evidence from Industrial Manchester, 1740-1850." *International Journal of Historical Archaeology* 15, no. 4 (2011): 596.

¹⁶ Michael Nevell, "Excavating 'Hell Upon Earth' Towards a Research Framework for the Archaeological Investigation of Workers' Housing: Case Studies from Manchester UK." *Industrial Archaeology Review* (2017): 86.

¹⁷ Michael Nevell, "Legislation and Reality: The Archaeological Evidence for Sanitation and Housing Quality in Urban Workers' Housing in the Ancoats Area of Manchester between 1800 and 1950." *Industrial Archaeology Review* (2014): 52.



Figure 2: Map of Manchester. (Simon, Holder, and Manchester (England) City Council, 2008, page 1).

In 18th century Northern Quarter, workshop residences commonly comprised of three levels and were single room deep, featuring an attic and a cellar which served as a workspace, while the ground and first floor were reserved for domestic living. The living and working spaces were evenly distributed, each covering an area of approximately 60 square meters.¹⁸ Workshop houses were often distinguishable by a large, wide window at the front or back, bringing light into the loomshop workspace area and acting as signage for prospective customers (Figure 3). Some of these workshop dwellings maintained their character and did not evolve into tenements.

¹⁸ Michael Nevell, "Living in the Industrial City: Housing Quality, Land Ownership and the Archaeological Evidence from Industrial Manchester, 1740-1850." *International Journal of Historical Archaeology* 15, no. 4 (2011): 600.

Examples of such preserved structures can be found within a block in the Northern Quarter, delineated by Kelvin Street, Turner Street, Back Turner Street, and Brick Street. Built in 1773 by textile manufacturers Richard and Mary Manchester, all the properties in this urban block included heated floors. The ground floor in each property featured a sheltered passage connecting the southern and middle properties, leading to an enclosed courtyard at the rear.¹⁹ Although tenants lacked running water and had to use exterior privies,²⁰ it is worth noting that workshop dwellings were in considerably better conditions and provided better living conditions to its tenants than the overcrowded, back-to-back houses and cellar dwellings later found in Lever Street and the Ancoats. This distinction between work and living space, access to exterior space, brightly lit interior spaces, easy access, and limited occupancy, enabled workshop dwellings to provide a better quality of housing than other properties in the area. Moreover, this trend could be attributed to the high rents of workshop dwellings' which hand-weavers could afford as they were well paid before the transition into steam powered factory spinning by the end of the 18th century.²¹ As labor didn't require skilled hands anymore and any skilled or unskilled man, woman, child could join the factory mills, hand-skilled weavers were pushed out of the job market and workshop dwellings gave way to tenements to accommodate the influx of working class individuals joining the factories. The attic and cellar, once utilized as workspaces, were later rented out as individual housing units, and a staircase leading into the cellar from the sidewalk was added, as well as the installation of doors and single brick walls to subdivide the newly formed housing units by blocking access to each floor.¹⁹ Through a process of subdivision,

¹⁹ Michael Nevell, "Living in the Industrial City: Housing Quality, Land Ownership and the Archaeological Evidence from Industrial Manchester, 1740-1850." *International Journal of Historical Archaeology* 15, no. 4 (2011): 598.

²⁰ Michael Nevell, "Living in the Industrial City: Housing Quality, Land Ownership and the Archaeological Evidence from Industrial Manchester, 1740-1850." *International Journal of Historical Archaeology* 15, no. 4 (2011): 600.

²¹ Simon Taylor and Julian Holder, *Manchester's Northern Quarter: The Greatest Meer Village* (Swindon: English Heritage, 2008), 12.

workshop dwellings that once housed one family can now cramp three families with as many as 20 people in 50 sqm.²²



Figure 3: Three story workshop dwelling which is recognizable by a wide window facing the street, located on 88 Street in the Northern Quarter. (Taylor and Holder, 2008, page 13).

By the beginning of the 19th century, overcrowded slum properties were beginning to emerge and Lever Street on the east of Manchester’s Northern Quarter is an example of workshop dwellings turned into tenements (Figure 4 and Figure 5). Michael Nevell describes the development of Level Street housing from 1780 to 1794 as the following:

“These began as a speculative development of five-, four-storey, workshop-dwellings built progressively over a decade by a plasterer, William Bradley (Taylor and Holder 2008, p. 24). The first phase spanned the period 1780-8 when a row of five houses was built. These had attic-floor

²² Michael Nevell, “Excavating ‘Hell Upon Earth’ Towards a Research Framework for the Archaeological Investigation of Workers’ Housing: Case Studies from Manchester UK.” *Industrial Archaeology Review* (2017): 90.

workshops but the basements, ground and first floors appear to have been divided for tenement housing in all but one case. Each house had its own rear yard with an outside privy. The second phase saw two-storeyed extensions, lit separately, built into the rear yard areas by around 1790 and a third phase by 1794 saw one-up-one-down cottages added to the rear of these in turn, facing Bradley Street. By 1831 a five bay, three-storey, warehouse was built across two back yards.”²³

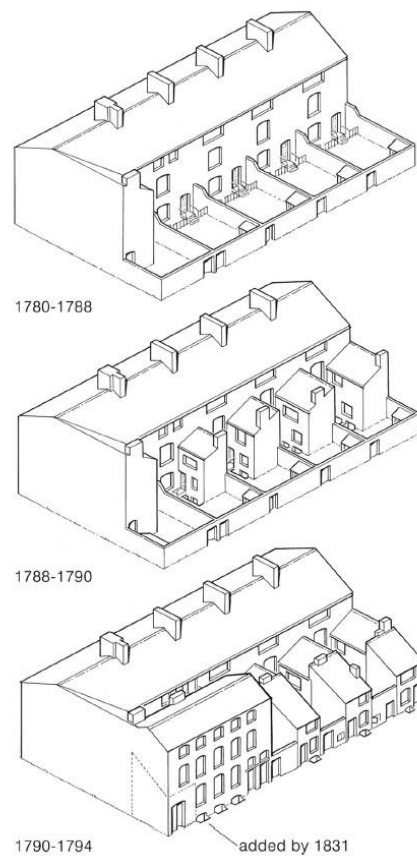


Figure 4: Lever Street rear development through backyard infilling from 1780 to 1788. (Taylor and Holder, 2008, page 24).

²³ Michael Nevell, “Living in the Industrial City: Housing Quality, Land Ownership and the Archaeological Evidence from Industrial Manchester, 1740-1850.” *International Journal of Historical Archaeology* 15, no. 4 (2011): 600



Figure 5: Reconstruction of Lever Street in the 1780s. Each floor was used as two-bedroom apartment or two single room apartments while the top floors functioned as workshop dwellings. (Taylor and Holder, 2008, page 25).

This new urban form that resulted from backyard infilling was to be classified as court housing, where all phases of the property can only be accessed through one narrow alleyway through the main street. This presented multiple disadvantages such as dimly lit spaces, poor ventilation, and posed as a danger during fires due to the narrow alleyways being the only point of entry and exit of the property. In conclusion, any previously empty backyard was being developed into industrial housing through a process of addition and infilling. In early 19th

century Angel Meadow, filling in backyard spaces was a more prevalent practice than subdividing interior areas as a means to accommodate more workers.²⁴ Soon enough, this uncontrolled residential development would lead to the infamous back-to-back and cellar houses populating 19th century Ancoats (Figure 6 and 7).

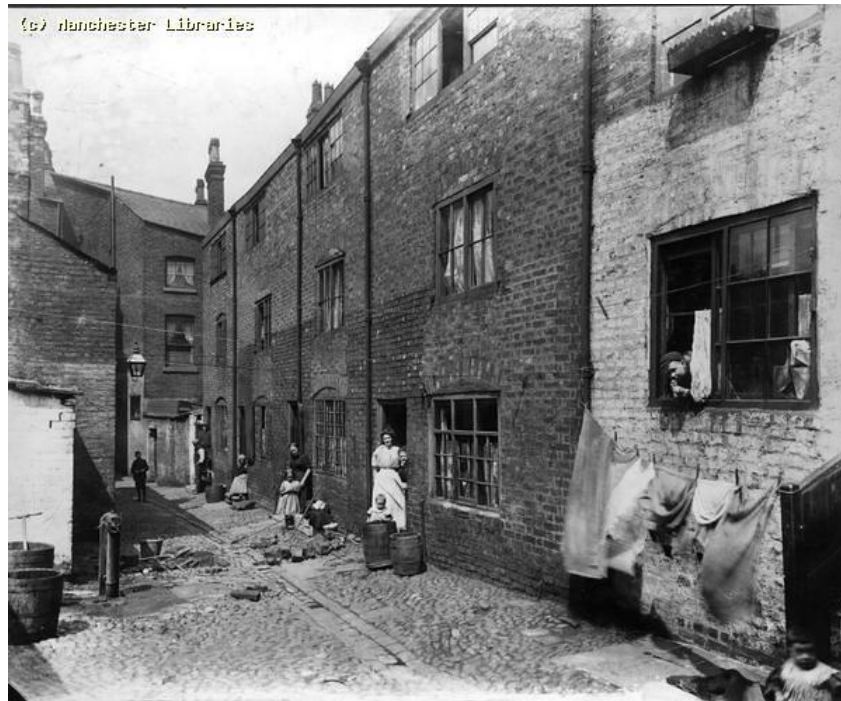


Figure 6: Back-to-back house in Ancoats, Manchester.

²⁴ Michael Nevell, "Excavating 'Hell Upon Earth' Towards a Research Framework for the Archaeological Investigation of Workers' Housing: Case Studies from Manchester UK." *Industrial Archaeology Review* (2017): 91.



Figure 7: Back-to-back house.

Back-to-back houses were constructed to optimize land utilization. In this design, each row of houses facing the street featured a rear wall devoid of windows, access points, or openings, known as a 'blind-back' wall.²⁵ The purpose of this wall, which was also known as a party wall, was for it to be shared with an additional row of back-to-back houses that would be constructed subsequently to face a court or backyard instead of the street. Only one mode of access was available, either through a narrow alleyway at the front or through the rear yard. Additionally, in the instances where back-to-back houses were designed in a cluster forming an enclosed shared court, the inner courtyard could only be accessed through a passageway under the first floor of the building²⁵ or through exterior ladders when staircases weren't part of the floorplan. In Manchester, back-to-back houses were larger when compared to those in Birmingham and Liverpool, with dimensions ranging between 12 and 15 feet square.²⁶ Back-to-back houses were popular at the time because of their affordability to poor, working class tenants

²⁵ Joanne Harrison, "The Origin Development and Decline of Back-To-Back Houses in Leeds 1787-1937." *Industrial Archaeology Review* 29, no.2 (2017): 101.

²⁶ Joanne Harrison, "The Origin Development and Decline of Back-To-Back Houses in Leeds 1787-1937." *Industrial Archaeology Review* 29, no.2 (2017): 102.

and building owners. They could be constructed in short amounts of time due to their high density, small scale, and cheap materials, although this often led to subpar construction methods.²⁷ In 2011, a row of ten back-to-back houses dating between 1794 and 1800 were excavated in Ancoats at the intersection between Jersey Street and Pickford Street, forming a property named Hall's Court.²⁸ The back-to-back dwellings in Hall's Court (Figure 8) stood at two stories tall and were constructed using 9 x 4¼ x 3-inch handmade bricks – a method widely familiar in other properties across Ancoats – and had an approximate footprint of 3.5 by 4.5 meters each.²⁹ Further away in Loom Street, another set of back-to-back dwellings was excavated, this one included cellar dwellings that were accessed through ladders from a trap door located on the ground level within each housing unit.³⁰ The cellar dwellings were designed without windows or openings, suggesting no access to sunlight or ventilation. Other back-to-backs houses with cellar dwellings in the Ancoats were poorly built and dug into clay, making them susceptible to flooding during heavy rain (Figure 9 and 10).³¹

²⁷ Joanne Harrison, "The Origin Development and Decline of Back-To-Back Houses in Leeds 1787-1937." *Industrial Archaeology Review* 29, no.2 (2017): 103.

²⁸ Michael Nevell, "Legislation and Reality: The Archaeological Evidence for Sanitation and Housing Quality in Urban Workers' Housing in the Ancoats Area of Manchester between 1800 and 1950." *Industrial Archaeology Review* (2014): 54.

²⁹ Michael Nevell, "Legislation and Reality: The Archaeological Evidence for Sanitation and Housing Quality in Urban Workers' Housing in the Ancoats Area of Manchester between 1800 and 1950." *Industrial Archaeology Review* (2014): 58.

³⁰ Michael Nevell, "Legislation and Reality: The Archaeological Evidence for Sanitation and Housing Quality in Urban Workers' Housing in the Ancoats Area of Manchester between 1800 and 1950." *Industrial Archaeology Review* (2014): 64.

³¹ Michael Nevell, "Excavating 'Hell Upon Earth' Towards a Research Framework for the Archaeological Investigation of Workers' Housing: Case Studies from Manchester UK." *Industrial Archaeology Review* (2017): 90.

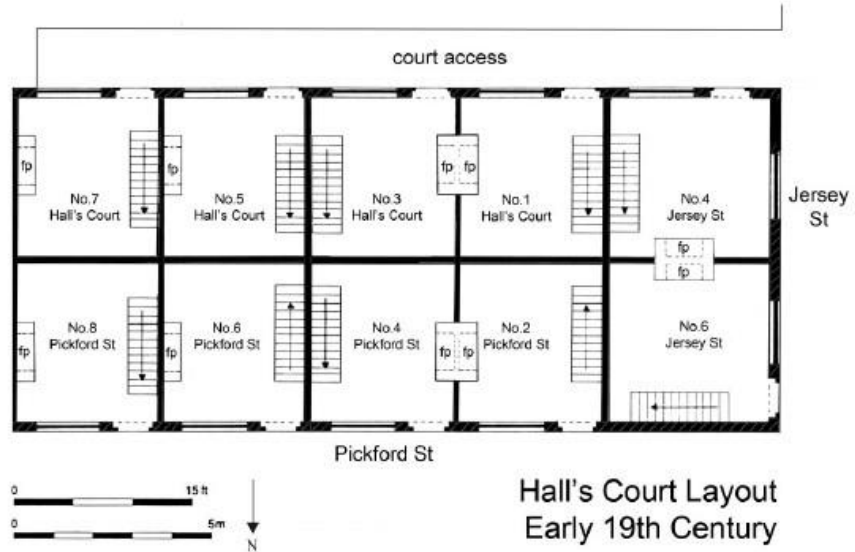


Figure 8: Reconstruction plan of the back-to-back house, Hall's Court. (Nevell, 2014, page 58).

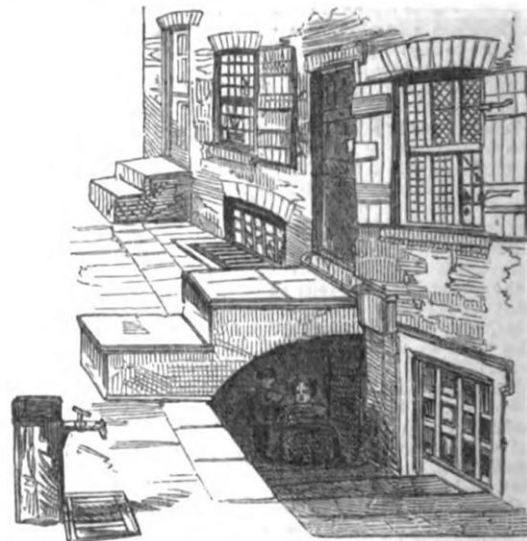
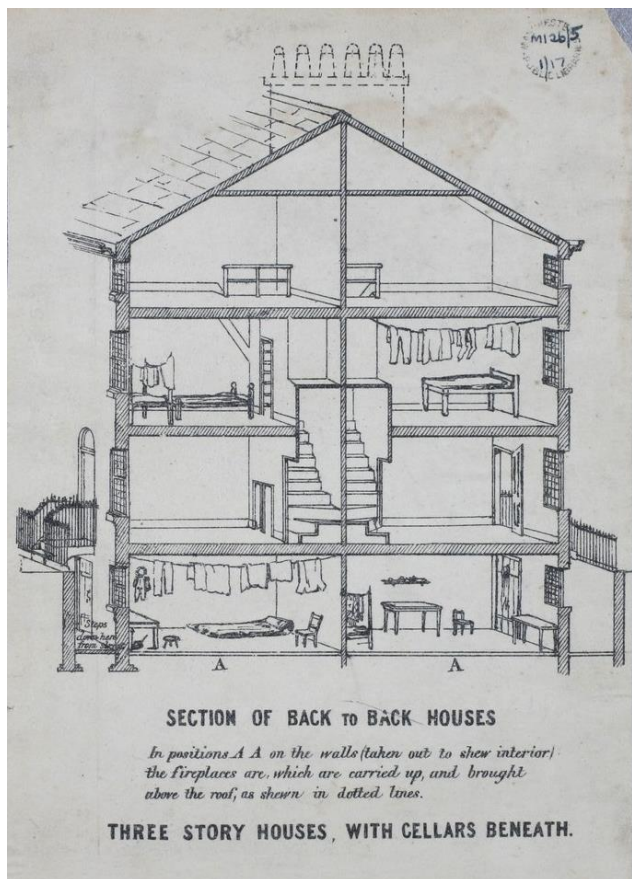


Figure 9 and 10: Left: section of a usual back-to-back house in 19th century Manchester. Right: cellar access. (Banens, 2021, page 103).

Although back-to-back houses are infamous in contemporary literature for their unsanitary conditions, it's important to remember that almost all other housing types in large industrial cities had exterior shared privies and amenities, with no running water or appropriate sewage treatment systems. The reason back-to-back houses and cellar dwellings were especially oppressive was because of their overcrowded nature, lack of access to exterior space and subpar ventilation. In the mid-19th century, legislation and regulations were beginning to improve industrial housing and public health in Manchester and across the United Kingdom. The Manchester Police Act of 1844 banned the construction of new back-to-back houses and in 1853, a by-law prohibited the conversion of cellars into dwellings and the building of new cellars with the intention of renting them as housing.³² As a result, new back-to-back houses don't appear in the Ancoats after the 1840s and the privately funded Manchester Waterworks and Improvement Act of 1867 demolished the remaining back-to-back houses in the city (Figure 11).³³ The enactment of the Labourers' Dwelling Act of 1868 allowed the clearance of slums and required landlords to perform regular maintenance to enhance housing standards, marking a significant departure from previous norms where the state lacked the authority to dictate property management practices to landowners and that it was the property owners' responsibility to improve public health.³⁴ Furthermore, the Public Health Act of 1875 included a clause that

³² Michael Nevell, "Excavating 'Hell Upon Earth' Towards a Research Framework for the Archaeological Investigation of Workers' Housing: Case Studies from Manchester UK." *Industrial Archaeology Review* (2017): 89.

³³ Michael Nevell, "Legislation and Reality: The Archaeological Evidence for Sanitation and Housing Quality in Urban Workers' Housing in the Ancoats Area of Manchester between 1800 and 1950." *Industrial Archaeology Review* (2014):69.

³⁴ Michael Nevell, "Legislation and Reality: The Archaeological Evidence for Sanitation and Housing Quality in Urban Workers' Housing in the Ancoats Area of Manchester between 1800 and 1950." *Industrial Archaeology Review* (2014): 50.

mandated all new housing developments provide access to exterior space and backyards, further limiting the construction of new back-to-back houses.³⁵

In terms of sanitation and hygiene, a survey by Manchester Board of Health reported that nearly 56.1% of Ancoats streets were contaminated with human waste because 55.4% of houses were without plumbing in 1831.³⁶ Three decades later and a third of houses in Ancoats continued to lack private sanitation and had to rely on shared exterior amenities. It wasn't until 1890 that Manchester transitioned into a waterborne system of sewage disposal and treatment.³⁷ Before 1890, the Public Health Act of 1848 was the only piece of legislation overseeing the quality of water supplies and sewage systems to mitigate the spread of cholera and typhoid.³⁸

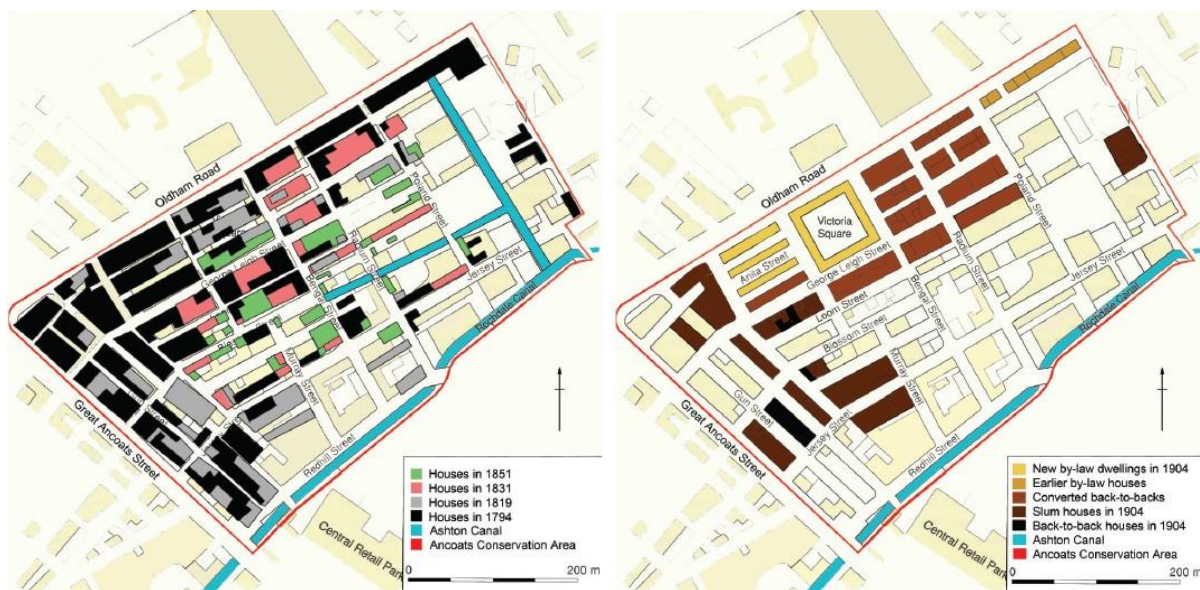


Figure 11: Maps showing the development of housing types after the enactment of new laws in northern Ancoats. (Nevell, 2014, page 54-55).

³⁵ Joanne Harrison, "The Origin Development and Decline of Back-To-Back Houses in Leeds 1787-1937." *Industrial Archaeology Review* 29, no.2 (2017): 109.

³⁶ Michael Nevell, "Legislation and Reality: The Archaeological Evidence for Sanitation and Housing Quality in Urban Workers' Housing in the Ancoats Area of Manchester between 1800 and 1950." *Industrial Archaeology Review* (2014): 52.

³⁷ Ian Douglas, Rob Hodgson and Nigel Lawson, "Industry Environment and Health through 200 Years in Manchester." *Ecological Economics* (2002): 243.

³⁸ Joanne Harrison, "The Origin Development and Decline of Back-To-Back Houses in Leeds 1787-1937." *Industrial Archaeology Review* 29, no.2 (2017): 106.

1.2 New York City Tenements

Across the Atlantic, similar housing conditions for the working class can be found in New York city. The overcrowding in 19th century New York was due to the city being the entry point for the influx of immigrants coming into the United States following the Second War of Independence in 1812. However, with this influx of immigrants came a housing crisis that led to the deterioration of housing quality and the establishment of tenement housings (Figure 12), bringing with it a myriad of diseases that ultimately contributed to the average death rate of 26,000 people in the years between 1883 and 1885.³⁹



Figure 12: New York City tenement house apartment. (Riis, 1890).

Tenements are defined as properties rented as housing that commonly accommodate two or three families. However, with no building or housing regulations, tenement apartment of 13 ft by 13 ft could be divided into smaller living spaces and house up to 20 men, women, and children (Figure 13 and 14). The rate of tenements varied according to square footage and

³⁹ Robert H. Bremner, "The Big Flat: History of a New York Tenement House." *The American Historical Review* (1958): 61.

whether they had views to the street. Rear tenements were commonly cheaper because they had views towards a court or garden rather than the street and were commonly constructed out of wood – which would later be banned by the Tenement Act of 1901. They started at two floors but regularly went up as high as four to five floors, with little consideration to the foundation's strength capacity (Figure 15).⁴⁰ In 1842, 6,618 families lived in rear buildings.⁴¹ Tenements also contained cellar spaces, which were rented out as housing, typically at a considerably lower cost compared to the apartments on the upper floors (Figure 16). There were 7,000 individuals living in 1,459 cellars in 1842,⁴¹ and their low rent cost reflected their deplorable quality as they were breeding grounds for mold and respiratory diseases because of the dampness, and often had no operable windows for ventilation or views to the outside. It wasn't until the Tenement House Act of 1867 that the Board of Health mandated all tenements without windows must now cut openings for ventilation, leading to the installation of over 46,000 windows in 1869.⁴⁰ By the late 19th century, the city's Board of Health revealed that out of New York City's 1.5 million population, approximately 280,000 families lived in tenements, which made up 1.2 million of the city's total population.⁴² The biggest concentration of tenements was found in the lower east side where up to 700 people lived per acre.⁴³ Jacob Riis, author of *How The Other Half Lives: Studies Among the Tenements of New York in 1890*, described the lower east side tenements as:

⁴⁰ Jacob A. Riis, *How the Other Half Lives: Studies among the Tenements of New York* (1890).

⁴¹ Robert W. De Forest, "A Brief History of the Housing Movement in America." *The Annals of the American Academy of Political and Social Science* 51 (1914): 8.

⁴² Edward Marshall, "New York Tenements." *The North American Review* (1893): 753.

⁴³ Beito David T and Linda Royster Beito. "The 'Lodger Evil' and the Transformation of Progressive Housing Reform 1890-1930." *The Independent Review* (2016): 488.

“The hot-beds of the epidemics that carry death to rich and poor alike”.⁴⁴



Figure 13: Old New York City house on Bleeker Street turned into a tenement house. (Riis, 1890).

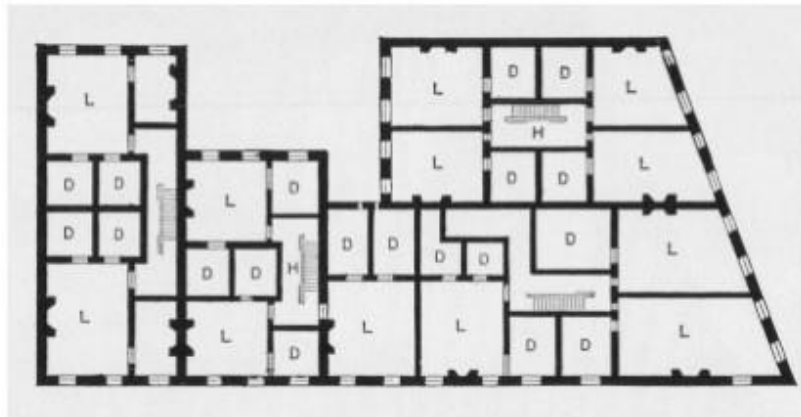


Figure 14: Bleeker Street tenement house plan. (Riis, 1890).

⁴⁴ Jacob A. Riis, *How the Other Half Lives: Studies among the Tenements of New York* (1890).

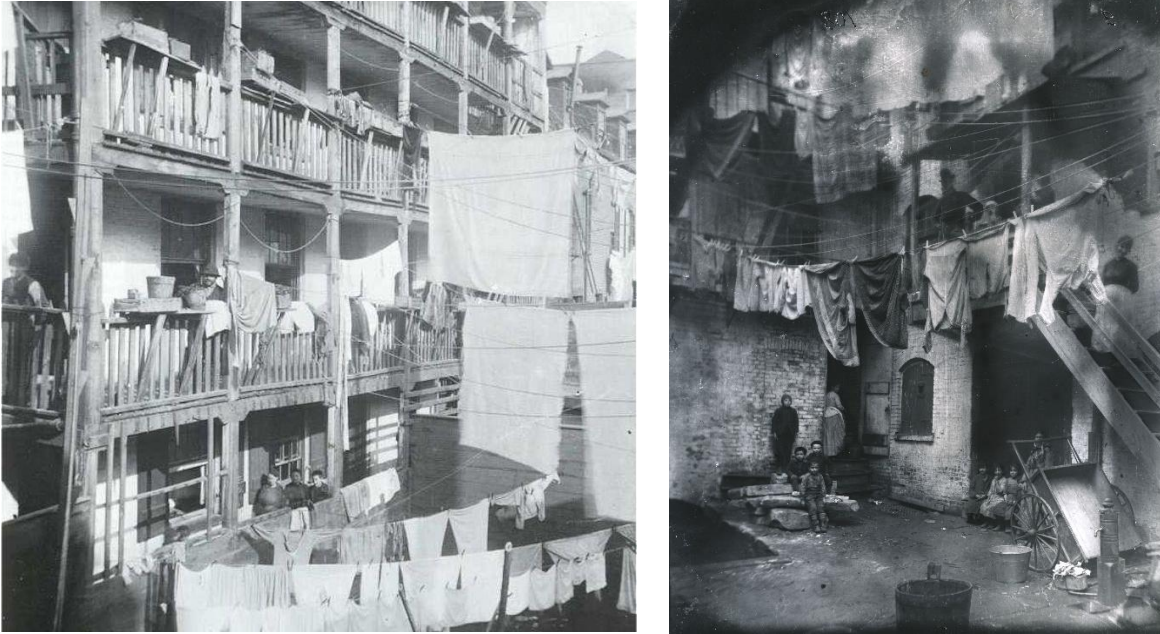


Figure 15: Rear tenement house. (Riis, 1890).



Figure 16: Cellar apartments. (Riis, 1890).

Some of the worst slum conditions due to overcrowding and a lack of sanitation can be found in Cherry Hill, also known as Gotham Court. Child mortality rates reached an all-time

high and the cause according to the Bureau of Vital Statistics was the “suffocation in the foul air of an unventilated apartment,”.⁴⁵ Riis notes:

“Gotham Court, where, in one cholera epidemic that scarcely touched the clean wards, the tenants died at the rate of one hundred and ninety-five to the thousand of population; which forced the general mortality of the city up from 1 in 41.83 in 1815, to 1 in 27.33 in 1855”.³⁹

By 1893, there were approximately 35,000 tenements, with 2,391 of them classified as rear tenements lacking street views; this meant that 75% of New York City's population resided in tenements facing dire conditions without any regulations or laws safeguarding tenants' rights.⁴⁶ According to Riis,⁴⁵ over half of the tenements by the late 19th century were owned by speculative landowners, an investment strategy where landowners would buy inexpensive, undesirable land and wait until the land's value increased before selling it for the highest market price. Throughout their ownership, speculative landowners avoided making investments into the property such as maintenance or new utility installation as such expenses would be considered a loss to them. As a result, numerous tenements were demolished to make space for factories and commercial properties rather than for the construction of improved tenements. This can be observed in the development of the Workmen's Home – also known as the Big Flat – between 1855 and 1888.

At the beginning, the Big Flat was constructed as a model tenement with improved housing quality. The project was founded by Robert M. Hartley who established and served as the executive secretary of the New York Association for Improving the Condition of the Poor.⁴⁷

⁴⁵ Jacob A. Riis, *How the Other Half Lives: Studies among the Tenements of New York* (1890).

⁴⁶ Edward Marshall, “New York Tenements.” *The North American Review* (1893): 753.

⁴⁷ Robert H. Bremner, “The Big Flat: History of a New York Tenement House.” *The American Historical Review* (1958): 54.

The Big Flat was established on a block costing \$30,500 spanning from 96 and 98 Mott Street to 47 and 49 Elizabeth Street, forming a six-level brick structure, making it the largest residential property in New York built before the 1880s.⁴⁸ Designed by architect John W. Ritch, the construction cost \$60,000, double the value of the land, and included 87 apartment units rented between \$5.50 to \$8.50 a month, each comprising of three bedrooms.⁴⁸ The Big Flat included two multi-purpose rooms for educational or recreational purposes, a courtyard garden, and basements that were used as storage space for each family residing in the property. However, despite efforts for ventilation, inner rooms often lacked adequate access to outside air, and water supply issues arose, especially in winter. Only one room in each apartment was ventilated and the toilets, sink traps, and water pipes were placed outside so they constantly froze in the winter.⁴⁸ Unfortunately, the property's intention of becoming a model tenement that improves the livelihood of the poor, working class was unrealized as the behavior of residents attracted crime. As a result, the property was sold for \$100,00 to the Five Points House of Industry, who spent an additional \$40,000 on renovating the property and transforming it into what became known as the Workingwomen's Home.⁴⁹ The new development opened its doors in October 1st, 1867 and was described as:

“It had space for between four hundred and five hundred boarders in sixty dormitories and twenty apartments on the five upper stories. The main entrance, now located on the Elizabeth Street side, led into an office or reception room, behind which were a parlor, sewing room, library, and a dining hall just under 100 feet long. The basement contained a kitchen connected by dumbwaiters with the dining hall, a bakery, laundry, "bathing department," and storage space.

⁴⁸ Robert H. Bremner, “The Big Flat: History of a New York Tenement House.” *The American Historical Review* (1958): 55.

⁴⁹ Robert H. Bremner, “The Big Flat: History of a New York Tenement House.” *The American Historical Review* (1958): 56.

As before there were sixteen water closets and one sink (now supplied with hot as well as cold water) on each of the upper floors. The house was lighted by gas and heated by fireplaces... The residents, except those whose employment kept them out later, had to be in the house by ten o'clock."⁵⁰

Nevertheless, the Big Flat fell into despair again, and the property couldn't retain a number of tenants that would offset the debt the trustees had gone into to renovate and refurbish the building. The building was sold again in 1873 and was eventually demolished in 1888 for industrial purposes. During the period before its demolition, the Big Flat's housing quality deteriorated rapidly under the new private management. In addition to substandard housing design, the building expanded its number of apartments to 91 and the landlord's failure to supervise the property eventually led to overcrowding. The lack of routine maintenance and supervision from the building's management led to sanitary complications such as contaminated halls and the removal of the newly added toilets in the top floor due to issues with leakage. Lastly, the biggest factor that led to the failure and undesirability of the Big Flat was its location. The property was located in an infamous neighborhood known for its unsanitary conditions such as garbage and ashes filled buildings, streets and gutters.⁵¹ Moreover, the property was adjacent to the Sixth Ward, the most disease-ridden, heavily populated district, and to the north was the Fourteenth Ward, known for its industrial factories and deteriorating tenements.⁵¹ When a factory was established right next door to the Big Flat in 1872, it significantly limited the amount of light and fresh air circulating into the building.⁵¹

⁵⁰ Robert H. Bremner, "The Big Flat: History of a New York Tenement House." *The American Historical Review* (1958): 57.

⁵¹ Robert H. Bremner, "The Big Flat: History of a New York Tenement House." *The American Historical Review* (1958): 58.

It's apparent through the Big Flat that even with the existence of better building practices and regulations; site location, routine maintenance, and property management are all integral factors to the betterment or deterioration of working-class tenements. These categories represent the issues that housing reform laws in New York started to address with the establishment of the Tenement House Act of 1901, such as the provision that a janitor, housekeeper and property manager must be responsible for the hygienic upkeep of the property.⁵² Figure 17. below displays a summary of the changes made to tenements houses after 1901.⁵³

<i>The New Tenement prior to 1901</i>	<i>The New Tenement after to 1901</i>
1. Dark rooms-10 out of 14.	1. All rooms light.
2. Unventilated rooms-10 out of 14.	2. All rooms well ventilated.
3. Public halls dark and narrow.	3. Public halls light and ventilated.
4. 75% of lot occupied.	4. 70% of lot occupied.
5. No limit to height of buildings on narrow streets.	5. Height limited to 1½ times the width of street.
6. Yards of interior lots 10 feet deep.	6. Yards of interior lots (6 story buildings) 13 feet, and 1 foot more for each additional story.
7. Yards of corner lots 5 feet.	7. Yards of corner lots 10 feet.
8. Air-shafts 28 inches wide.	8. Large courts 12 feet wide.
9. Air-shafts with no means of ventilation at the bottom.	9. Courts with an intake or tunnel at the bottom renewing the air constantly.
10. Air-shafts in the center of building 2¼ feet wide.	10. Inner courts in the center of building 24 feet wide.
11. Windows of rooms opening within 28 inches of windows in adjoining house.	11. No windows within 6½ feet of another window and generally 12½ feet apart and often 25 feet.
12. Rooms with but 60 square feet of floor area.	12. No room less than 70 square feet.
13. No requirement for size of living rooms.	13. One room of 120 square feet in each

⁵² Sherwood Grace, "Tenement Houses." *The American Political Science Review* (1911): 256.

⁵³ Robert W. De Forest, *Recent Progress in Tenement-House Reform* (Philadelphia: American Academy of Political and Social Science, 1904): 108-110.

	apartment.
14. Access to other rooms and water-closets through bedrooms.	14. Sole access through bedrooms prohibited.
15. Water-closets used in common by two families located in public halls.	15. A private water-closet for each family entirely within its own apartment.
16. Cellar rooms permitted with ceilings only two feet above ground.	16. Ceilings of cellar living rooms to be 4½ feet above ground.
17. Cellar walls and floors not protected against dampness.	17. Cellar walls and floors to be damp-proof.
18. Non-fireproof tenements 8 stories high permitted.	18. Non-fireproof tenements limited to 6 stories.
19. Fire-escapes with vertical ladders permitted	19. Substantial stairs required for fire-escapes.
20. Fire-escape balconies 30 inches wide permitted.	20. Fire-escape balconies required to be 3 feet wide.
21. Fire-escapes located in air- shafts.	21. Fire-escapes forbidden in shafts.
22. Iron gratings in shafts permitted without ladders or stairs.	22. Iron gratings banned, and stairs required.
23. Public halls narrow.	23. No public halls less than 3 feet wide, and to be increased with an increased number of families.
24. Stairs narrow.	24. No stairs less than 3 feet and to be increased with an increased number of families.
25. Stairs so steep as to injure the health of women.	25. No stairs with a rise of more than 8 inches.
26. Wooden stairs and non-fireproof halls in five story buildings.	26. Stairs and halls to be completely fireproof.
27. Public halls not shut off from non-fireproof parts of the building.	27. Public halls shut off from non-fireproof parts of building.
28. Wooden tenement houses for six families permitted outside of fire limits.	28. No wooden tenement house to be occupied by more than four families.

Chapter 2: 20th Century Garden City Movement

With the turn of a century and as housing reform laws began to protect the rights of industrial workers, model villages that prioritized healthy living conditions for the working class were being built across the United States and the United Kingdom. Model villages were communities built by industrialists or landowners at the start of the 19th century to house industrial factory workers outside of overcrowded urban cores where they can work and live in healthy settlements. Model villages tended to provide better living conditions because of a lack of overcrowding, regular sanitation practices, minimal air pollution, and access to public amenities and recreational activities. Some of the earliest and most notable model villages in the United Kingdom with high living conditions were Bourneville, Port Sunlight, and New Earswick. Bourneville was located in Bournbrook Hall in the south of Birmingham, an industrial city infamous for its slum back-to-back houses. Built by the Cadbury brothers, Bourneville primarily served its chocolate factory workers and contained sports fields, fishing lakes, and 313 cottages that had ample access to sunlight, ventilation, and spacious gardens.⁵⁴ In Port Sunlight, the Lever family established a residential community comprising of 800 houses for the 3,500 individuals making up their soap factory workers and their families.⁵⁴ As for New Earswick, the village was developed on a 28-acre plot of land and consisted of 150 houses arranged in rows of two, four, and six units, all oriented towards a central green space to maximize exposure to sunlight through an innovative site plan requiring the adjustment of standard gridded street layouts.⁵⁵ One of the biggest contributors to the success of the mentioned model villages was a regulated planning layout that ensured low density housing to avoid the debilitating, overcrowded,

⁵⁴ “From Factory to Fireside: 6 Marvellous Model Villages,” The Historic England Blog, January 5, 2024, <https://heritagecalling.com/2017/08/31/from-factory-to-fireside-6-marvellous-model-villages/>.

⁵⁵ Eric Paul Mumford, *Designing the Modern City: Urbanism since 1850* (New Haven: Yale University Press, 2018), 89.

unsanitary conditions found in industrial cities at the time. The complete separation of industrial and residential zones and the inclusion of amenities such as open-air swimming pools and pocket parks allowed workers to pursue recreational activities and hobbies outside of work. It became apparent that the high quality of living found in these villages needed to be expanded on a larger scale, and thus grew a need for an urban planning strategy that could be adapted to densely populated cities. All these model villages would later help in the development of Letchworth, Ebenezer Howard's first Garden City. Many of the planners in the mentioned model villages would go on to serve as planners in Letchworth as well.

Influenced by model villages, John Ruskin and William Morris; Ebenezer Howard developed the Garden City movement; a planning strategy rooted in social reform and community welfare over capitalist and industrialist interests. The movement aimed to capture the primary benefits of the countryside and the city while avoiding the disadvantages presented by urbanization such as slum housing, overcrowding and unhygienic conditions. Ebenezer intended for Garden Cities to be 'small communities planned on a concentric pattern that would accommodate housing, industry, and agriculture, surrounded by greenbelts that would limit their growth.'⁵⁶ It is important to note that garden cities were among the first town planning schemes to focus on the promotion of health — mental, physical and moral — as a governing principle. Ebenezer Howard described a garden city as 'a town, planned for healthy living, organized for industry, of a size necessary to give a full measure of social life, but no larger, surrounded by a rural belt; the whole of the land being in public ownership.'⁵⁷ The first garden city was to be in Letchworth, situated in Hertfordshire, approximately 30 miles from London. The location was carefully selected

⁵⁶ Susanna Moreira, "What Are Garden Cities?," ArchDaily, May 12, 2021, <https://www.archdaily.com/961275/what-are-garden-cities>.

⁵⁷ Norman Macfadyen, "The Garden City and Public Health." *The Journal of State Medicine (1912-1937)* 29, no. 10 (1921): 305.

because of the railway passing from London to Letchworth which would attract workers willing to commute between the two cities, as well as the existence of appropriate water supply and drainage systems (Figure 18). Additionally, towards the end of the 19th century, London had reached a population of 900,000 of which 315, 000 were recorded to be living in overcrowded, slum housing.⁵⁸ Thus, a new, healthy, green city model was needed to alleviate the conditions of the working class found in London.

Better planning and improved housing are essential conditions for enhancing the health of individuals. Hence, this chapter will concentrate on examining how the garden city movement addressed these two aspects, using Letchworth as a case study. Within these two sections, the chapter will also address certain issues identified in the previous chapter, which contribute to the existence of slum housing in 19th century industrial cities, such as land ownership, property management, housing quality, density, and pollution. It will examine how the garden city approach alleviated these conditions. Although many of the planning and zoning strategies first presented in garden cities are still implemented today in city planning, the movement failed to attract industrial workers and instead was primarily populated by middle class intellectuals looking to participate in the garden city movement as well as skilled artisans that could afford to live in Letchworth. The failure of the garden city movement can be attributed to Letchworth's high rents and its incapacity to accommodate the increasing number of post-war immigrants without becoming prohibitively expensive for the unskilled laborers migrating from urban areas who were its intended beneficiaries (Figure 19).⁵⁹ The insights drawn in Chapter 2 will contribute to the comprehension of Chapter 3, which expands on the principles and pitfalls of

⁵⁸ Mervyn Miller, *English Garden Cities: An Introduction* (Swindon: English Heritage, 2010), 1.

⁵⁹ Eric Paul Mumford, *Designing the Modern City: Urbanism since 1850* (New Haven: Yale University Press, 2018), 91.

garden cities to advocate for a public health-oriented approach to accommodating growing housing density within metropolitan cities.



Figure 18: Letchworth railway station in 1913. (Livesey, 2011, page 1).

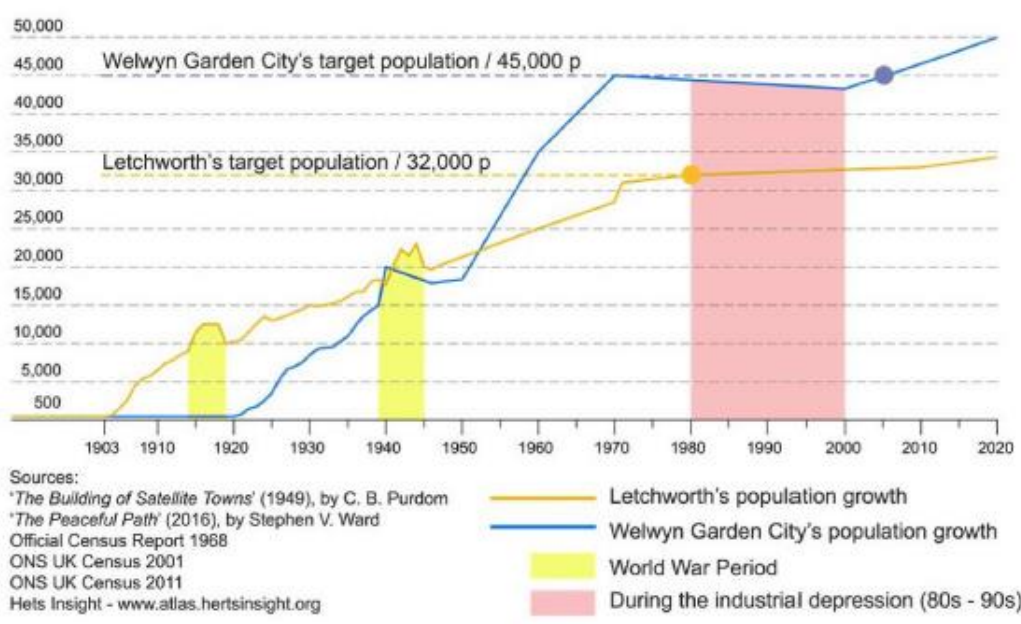


Figure 19: Letchworth and Welwyn Garden City's population growth graph. (Pastor, Canniffe, and Jiménez, 2023, page 3).

2.1 Master Planning & Health in Letchworth

There are multiple planning strategies that contributed to the prosperity of health in Letchworth but this chapter will primarily focus on zoning, governance, prohibition of disorderly habits, and access to nature and how it differed from the qualities found in industrial cities described in the first chapter. Letchworth was established in 1903 by Mr. Barry Parker and Sir Raymond Unwin who collaborated on its masterplan and design (Figure 20). Skilled and unskilled laborers from the city were able to find jobs in Letchworth, and the existence of the green belt surrounding the town allowed for agricultural farmers to live and work in Letchworth, resulting in a variety of industries that made the town economically independent and self-sustainable. The garden city's core principle emphasized the creation of towns encircled by green belts which facilitated Letchworth's controlled and systematic development, enabling the town to avoid the overcrowded and chaotic living conditions found in cities like London and Manchester. In terms of zoning, the residential, commercial, and industrial areas in Letchworth were distinctly separated but situated close enough for factory workers to walk conveniently between their workplaces and homes without expenditure of time, energy or money.⁶⁰ In the original 1903 masterplan of Letchworth, the industrial area where factories and workshops can be found was only allocated 110 acres with the intention of limiting the size and urban growth of the industrial area in Letchworth⁶¹ so that each worker and his family was able to have a separate house and a garden, as well as access to immense open green space — allowing residents in the process to practice healthy lifestyles such as physical exercise and the ability to farm their own food in their

⁶⁰ Norman Macfadyen, "The Garden City and Public Health." *The Journal of State Medicine (1912-1937)* 29, no. 10 (1921): 305

⁶¹ Edgar Bonham-Carter, "Planning and Development of Letchworth Garden City," *Town Planning Review* 21, no. 4 (1951): 362.

private gardens.⁶² To further improve the physical health of Letchworth residents, the newly established Urban District Council in 1919 owned and maintained 90 acres of recreational grounds and playing fields in the town center, oversaw the management of health services, and supervised the upkeep of roads and public open spaces; while the County Council allocated the provision of 26 acres to school playing fields.⁶³ It is worth mentioning that out of the 3700 acres of Letchworth, 148 acres was reserved for clubs with exterior activities and sports organizations to promote wellness.⁶² Additionally, Letchworth implemented measures to control its expanding residential density, aiming to prevent overcrowding similar to that observed in industrial cities. This was achieved by regulating the footprint of properties according to their value, as outlined in the 1919 Housing Act.⁶⁴ This law also allowed Letchworth's Urban District Council to set minimum floor areas for living rooms and bedrooms to ensure high quality housing.

Figure 13
Map of Letchworth: the first garden city.

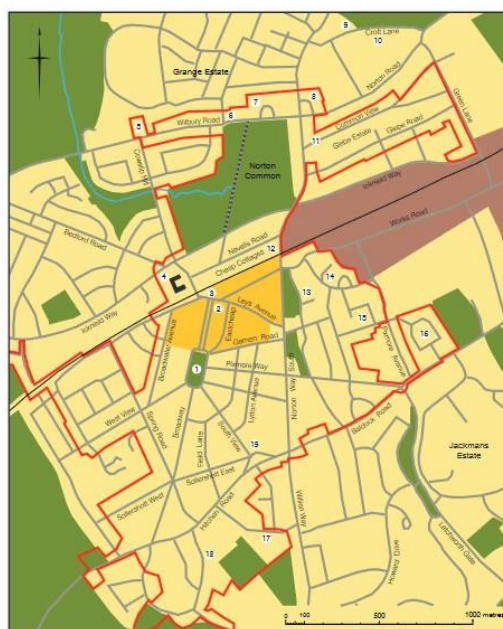


Figure 20: Map of Letchworth. (Miller, 2010, page 19).

⁶² Norman Macfadyen, "The Garden City and Public Health." *The Journal of State Medicine (1912-1937)* 29, no. 10 (1921): 305.

⁶³ Edgar Bonham-Carter, "Planning and Development of Letchworth Garden City," *Town Planning Review* 21, no. 4 (1951): 362.

⁶⁴ Mervyn Miller, "Letchworth Garden City Eighty Years On." *Built Environment (1978-)* 9, no. 3/4 (1983): 170.

The selected factories and industries allowed in Letchworth and the explicit separation of functions within the city prioritized the health of residents by prohibiting any industries that can contribute to smoke pollution, soil contamination, or toxic chemicals that could spread epidemics.⁶⁵ This resulted in documented decreased rates of infant mortality and respiratory lung diseases such as tuberculosis and pneumonia, both of which were among the leading causes of death in industrial cities. Mortality rates in Letchworth were even further lower than rural areas, which were considered to be the areas with the better living conditions at the time.

“In 1918 our infant mortality was 30 for 1,000 births, and in 1919 our total mortality was 5.3 per 1,000. population, and our pulmonary tuberculosis death-rate was 0.1 per 1,000.”⁶⁶

It's crucial to highlight that the preservation of the rural belt and the implementation of numerous laws safeguarding the health of Letchworth residents stemmed from the garden city principle of promoting self-governance. The ownership of the land was in the hands of First Garden City Limited company, but the buildings were owned and rented by the residents of Letchworth. This leasehold system ensured high-quality housing considering the tenants lived in the properties they co-owned, protected the land from exploitation and speculative owners, and maintained the affordability of the houses.⁶⁷ Although Letchworth was economically independent and self-sustainable without the need of imported goods, the leasehold system meant that residents had the power to assert their community interests through allowing imported goods and industries if a local manufacturer was failing to provide safe, sanitary and healthy

⁶⁵ Brett Clark, “Ebenezer Howard and The Marriage of Town and Country: An Introduction to Howard’s ‘Garden Cities of To-Morrow,’” *Organization & Environment* 16, no. 1 (2003): 93.

⁶⁶ Norman Macfadyen, “The Garden City and Public Health.” *The Journal of State Medicine (1912-1937)* 29, no. 10 (1921): 311.

⁶⁷ Antonio Blanco Pastor, Eamonn Canniffe, and Carlos Jesús Rosa Jiménez, “Learning from Letchworth and Welwyn Garden City: Garden Cities’ Policies for the Development of Existing Settlements in the Contemporary World,” *Land Use Policy* 132 (2023): 6.

work environments with livable wages.⁶⁸ In addition, the moral health of residents was prioritized as well. Letchworth prohibited the selling and public consumption of alcohol to avoid the immoral habits produced by drunkenness that were often found in industrial cities. To consume alcohol in a public setting, residents would need to walk two miles to the nearby villages of Norton and Willian whereby licensed liquor houses under the Peoples Refreshment House Association can be found.⁶⁹ Because Letchworth was built to attract unskilled workers from industrial cities, the prohibition of alcohol aimed to civilize the working class and enforce healthier practices. Consequently, Letchworth upheld its cleanliness standards on public streets, prompting business owners to show enthusiasm in establishing factories, acquiring land, and leasing properties.⁷⁰ This was primarily due to the dependable nature of Letchworth workers, who consistently paid their rent punctually and attended their factory shifts in a sober state. This approach of morally civilizing the working class through the promotion of physical exercise and health was a result of bourgeois and middle-class concerns. They viewed pubs and gambling establishments as places for potential economic and political dissent.⁷¹ By redirecting the working class towards disciplined habits such as exercise, fitness, health, movement, leisure, recreation, dance, and sports, it was believed that English laborers would improve their health and consequently enhance productivity.⁷²

According to Letchworth's first resident doctor Norman Macfadyen:

⁶⁸ Brett Clark, "Ebenezer Howard and The Marriage of Town and Country: An Introduction to Howard's 'Garden Cities of To-Morrow,'" *Organization & Environment* 16, no. 1 (2003): 93.

⁶⁹ Dugald MacFadyen, "Sociological Effects of Garden Cities," *Social Forces* 14, no. 2 (1935): 256.

⁷⁰ Dugald MacFadyen, "Sociological Effects of Garden Cities," *Social Forces* 14, no. 2 (1935): 256.

⁷¹ Samuel M. Clevenger and David L. Andrews, "Regenerating the 'Stock' of the Empire: Biopower and Physical Culture in English Garden City Planning Discourse, 1898-1903," *The International Journal of the History of Sport* 38, no. 2-3 (2021): 285.

⁷² Robin Veder, "The Gardener's Exercise: Rational Recreation in Early-Nineteenth-Century Britain," *Proteus* 25, no. 2 (2008): 54.

“In Letchworth our workers leave home after breakfasting with the family, they walk or cycle to their work; they come home to dinner, and then by 6 o'clock in the evening they are out in their gardens or ready to play cricket, golf, tennis, or do anything else they like. By this means they are able to preserve health, pleasure and money for their own enjoyment and that of their families.”⁷³

⁷³ Norman Macfadyen, “The Garden City and Public Health.” *The Journal of State Medicine (1912-1937)* 29, no. 10 (1921): 305.

2.2 Social & Affordable Housing

Contrary to assumption, residing in large tenements isolates industrial workers due to inadequate privacy provisions. Every individual requires a sense of privacy to cultivate social connections in secure, healthy environments, which are crucial for workers' mental well-being. In Letchworth, Parker and Unwin incorporated cooperative housing to provide affordable housing for all social classes, prompt residents to be self-managers, and encourage social relations and neighborliness which was a pillar of the garden city movement for its positive affect on mental health and community wellness.⁷⁴ Before the first world war, 1060 working class apartments were built in Letchworth. Although many laborers preferred to live in single family houses with gardens of their own, the cost of building materials was high and Letchworth was unable to attract industries to the town due to limited financing.⁷⁵ To demonstrate that high quality living conditions and aesthetic housing design can be built for low cost, Thomas Adams organized the Letchworth Cheap Cottage Exhibition in 1905 (Figure 21).⁷⁶ The exhibition allowed the architect M. H. Baillie Scott to build an experimental pair of cottages which could be used for cooperative housekeeping through the inclusion of 'folding screens to divide up the hall, dining room and drawing room areas'.⁷⁷ The threshold between the two houses was crossed through a door at the rear of the house in the party wall between the two parlors, a well-ventilated space that was intended for recuperation and relaxation.⁷⁸ Each house costed £210 to build and was only affordable for the middle class who ended up buying the cottages and using

⁷⁴ Kate Henderson, Katy Lock, and Hugh Ellis, *The Art of Building a Garden City: Designing New Communities for the 21st Century* (Newcastle: RIBA Publishing, 2019), 20.

⁷⁵ Edgar Bonham-Carter, "Planning and Development of Letchworth Garden City," *Town Planning Review* 21, no. 4 (1951): 362.

⁷⁶ Konstanze Sylva Domhardt, "The Garden City Idea in the CIAM Discourse on Urbanism: A Path to Comprehensive Planning," *Planning Perspectives* 27, no. 2 (2012): 179.

⁷⁷ Lynn F. Pearson, "The Cooperative Housekeeping Boom," *The Architectural and Social History of Cooperative Living* (1988): 86.

⁷⁸ Lynn F. Pearson, "The Cooperative Housekeeping Boom," *The Architectural and Social History of Cooperative Living* (1988): 87.

them as a single house. However, the houses designed by Scott inspired Parker and Unwin in their development of Quadrangle cooperative houses in garden cities. The cooperative houses in Letchworth were all developed from modified middle-class houses and designed as conventional cottages arranged in low density groups.⁷⁹ The cooperative house, Homesgarth, in Letchworth will be examined further as a case study (Figure 22). Homesgarth shared certain similarities with the large tenements found in industrial cities like London and New York, as illustrated by the example of the Big Flat discussed in Chapter 1, particularly in terms of shared amenities among residents. However, the comparison ends there. Cooperative houses in Letchworth prioritized healthy living conditions and avoided overcrowding and were described as:

“The architects were anxious to disassociate the schemes from working class grouped housing, such as the tenement blocks recently built in large numbers by the London County Council. In contrast to this and other tenement housing, Homesgarth used... a "dainty cottage style": simple wooden floors and furniture, tiled fireplaces and painted walls in the communal dining room, and, on the exterior, a rurified Arts & Crafts style of tiled roofs, red brick, and white rough-cast walls in keeping with rest of Letchworth's architecture”.⁸⁰

⁷⁹ Frank Jackson, *Sir Raymond Unwin: Architect, Planner and Visionary* (London: A. Zwemmer, 1985), 72.

⁸⁰ Iain Borden, “Social Space and Cooperative Housekeeping in the English Garden City.” *Journal of Architectural and Planning Research* (1999): 248.

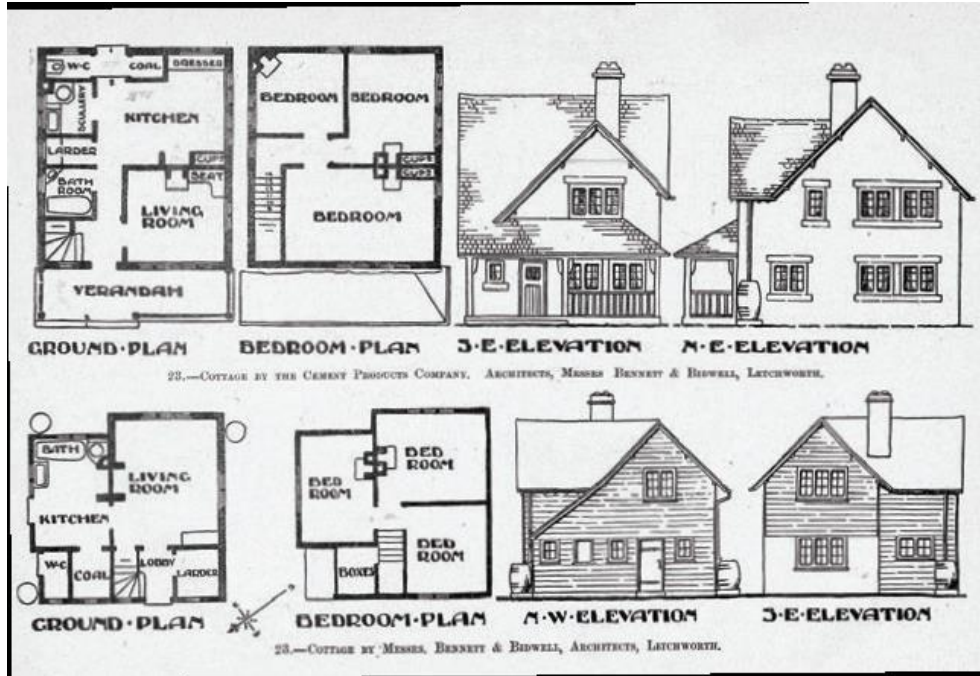


Figure 21: Plans showing layout of the £150 homes from the Cheap Cottages Exhibition. (Henderson, Lock, and Ellis, 2019, page 21).



Figure 22: Homesgarth cooperative quadrangle in Letchworth, 1910-1913. (Borden, 1999, page 244).

Homesgarth's quadrangle plan was reminiscent of Oxford college dormitories and comprised of working-class cottages grouped together with shared amenities and utilities, including a common room for gatherings and recreational or educational activities (Figure 23). Although Homesgarth provided one-bedroom apartments, the most popular apartments were the two or more bedrooms as residents often enjoyed having additional rooms to entertain their guests or use for leisure.⁸¹ The publicly shared interior facilities which included a dining hall, tea-room, reading rooms, and smoking rooms were often located in the main administration building.⁸¹ The inclusion of exterior facilities was crucial in promoting physical activity hence Homesgarth provided common gardens, tennis courts, and croquet lawns.⁸¹ Homesgarth was designed to promote affordability across all social classes and to foster improved social relations between the working class and middle class. Therefore, in order to attract the middle class to embrace cooperative living, it was essential to offer them their accustomed living standards at a reduced cost. This included amenities such as district heating, service telephones, labor-saving kitchen equipment, and the provision of professional staff, who had their own separate accommodations situated on the upper floors.⁸² The staff were responsible for maintaining both the grounds and the apartments, handling cooking and cleaning duties for the residents, and managing the property to prevent it from falling into disrepair. This responsibility was crucial, particularly when considering the inadequate maintenance and management observed in the tenements of industrial cities as discussed in Chapter 1. It is evident through the plans of Homesgarth and the variety of available public amenities that co-operative housing provided the working class with a quality of housing never experienced before. However, the non-

⁸¹ Iain Borden, "Social Space and Cooperative Housekeeping in the English Garden City." *Journal of Architectural and Planning Research* (1999): 248.

⁸² Letchworth Co-operative Houses Ltd, *Homesgarth: A scheme of housekeeping and a solution of the problem of domestic service*. (Prospectus, FGCM, 1909).

conventional housing arrangements of cooperative housing was difficult to finance, especially when the First Garden City Limited company who owned Letchworth was struggling to attract residents and industries to Letchworth.⁸³ As a result, the cost of rent for cooperative houses in Letchworth increased and became prohibitively expensive for the unskilled working-class laborers. Instead, the apartments were primarily leased by skilled laborers, artisans, and some middle-class visitors from out of town who were looking to experience the world's first garden city.

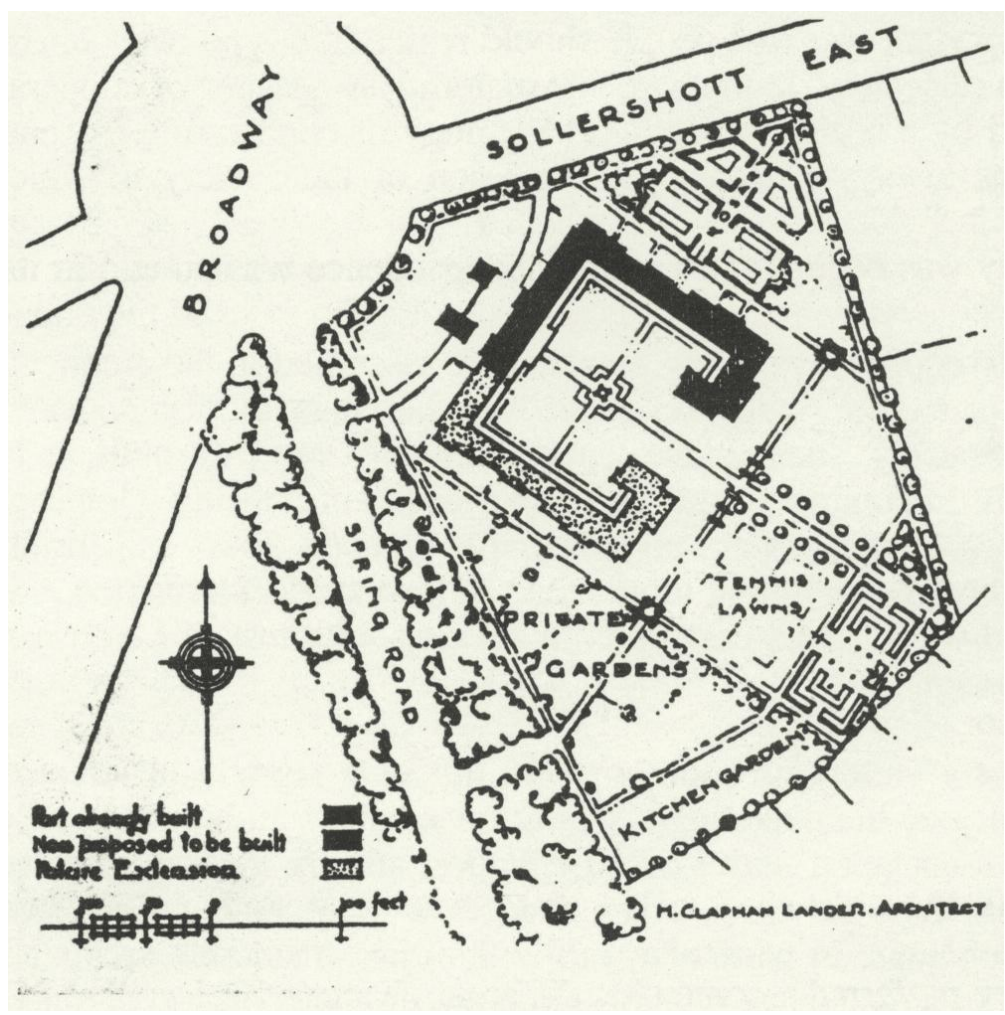


Figure 23: Homesgarth quadrangle plan. Only the administration section **and** the northern half of the scheme were ever built., 1910-1913. (Borden, 1999, page 247).

⁸³ George Montagu Harris, *The Garden City Movement* (London: Garden City Press, 1906), 80.

Despite its failure at financially accommodating the working class, cooperative houses such as Homesgarth were Parker and Unwin's method of civilizing the working class and reforming social hierarchy through the integration of the working class and the middle class in garden cities. The struggle for providing the working class with dedicated affordable housing has been a challenge for Letchworth since its establishment in 1903 because the architects and planners of Letchworth focused their efforts on ensuring a high standard of quality and craftsmanship in residential properties, rather than prioritizing building and material costs. Additionally, the houses showcased in the Cheap Cottage Exhibition of 1905 were considered too costly for the middle class, let alone for the working class, who were migrating in large numbers with the hope of discovering improved living conditions in garden cities. The lack of care towards providing affordable housing for all despite the garden city's principle of claiming otherwise contributed to the movement's failure. This also contributed to neighborhood segregation according to income, resulting in blue-collar workers, council houses and privately owned dwellings to be clustered in different residential areas across Letchworth. It's clear that the town-country model that Ebenezer Howard envisioned for Letchworth and garden cities lacks longevity if it can't provide affordable housing that accommodated for growing population density without compromising tenant health and housing quality. Although cooperative houses like Homesgarth in Letchworth were not the earliest forms of communal living during that period, their alignment with garden city ideals and placement within garden cities — which prioritized health by facilitating access to outdoor spaces, encouraging farming, gardening, and physical activity, overseeing property management and maintenance, separating industrial and residential zones to reduce pollution and the risk of epidemics, and monitoring moral health through the regulation of disorderly conduct — effectively demonstrated the influence of health-

centered urban planning and housing design in enhancing the quality of life. While the utopian vision of garden cities struggled to reconcile population and high housing density with affordability for all income levels at the time, could modern adaptations of garden city principles provide solutions to contemporary challenges in metropolitan areas, particularly addressing issues regarding public health, housing, and affordability?

Chapter 3: 21st Century Urbanism & Health

While the Garden City movement introduced progressive urban planning strategies focused on health that addressed overcrowding, offered high quality social housing, and fostered mental and physical well-being through neighborhood layout and access to exterior space and amenities, it ultimately struggled to sustain affordability for the working class it sought to serve. In *Healthy Urbanism*, Pineo describes Howard's Garden City movement as 'offering a physical ideal that tended to ignore the often contested, gendered, variegated and value-lade characteristics of cities.⁸⁴ Neglecting to provide accessible, affordable housing and healthy living conditions for low-income individuals and those from disadvantaged communities was a primary contributor to the Urban Health penalty at the time. The Urban Health penalty was a term used to define 19th and 20th century inequitable urban conditions found in inner cities that tended to concentrate poor people from disadvantaged communities in specific neighborhoods and expose residents to unhealthy environments.⁸⁵ The Urban Health penalty offered an explanation to the prevalent health disparities at the time. Today, we understand that housing and neighborhood conditions are integral components of the Social Determinants of Health, emphasizing their influence on both individual and population health within urban areas.

Social and Structural Determinants of Health (SSDOH) are two interrelated subjects that impact individual and population health inequities (Figure 24). Social Determinates are the result of Structural Determinants of health. Social Determinants of health are defined as the conditions which people grow under, such as living conditions, economic stability, education,

⁸⁴ Helen Pineo, *Healthy Urbanism: Designing and Planning Equitable, Sustainable and Inclusive Places* (Singapore: Palgrave Macmillan, an imprint of Springer Nature Switzerland AG, 2022), 37.

⁸⁵ Nicholas Freudenberg, Sandro Galea, and David Vlahov, "Beyond Urban Penalty and Urban Sprawl: Back to Living Conditions as the Focus of Urban Health," *Journal of Community Health* 30, no. 1 (February 2005): 2.

discrimination, and access to housing or medical services⁸⁶; while Structural Determinants are the primary root for health inequity because they directly impact and cause the Social Determinates. Structural Determinants are defined as the social, economic, and political policies that generate social hierarchies which impact access to health.⁸⁷ These policies are often determined with race, gender, social class, geography, sexual identity bias that eventually contribute to health disparities across different communities.⁸⁶ It's important to note that socioeconomic and structural policies can act as barriers to health, and poor health can also act as a barrier to socioeconomic advancement. Therefore, the two elements simultaneously impact one another which can have devastating results to the health of individuals and communities facing historical injustices. SSDOH shape individual health behavior because they impact/define the constraints and barriers facing health promotion which eventually lead to health inequity on the population level. Public health professionals are tasked with addressing health inequity on the individual and population level through looking into historical and contemporary injustices and proposing interventions that remove barriers such as poverty and discrimination to promote health equity.⁸⁶ It's important to acknowledge that public health professionals are more concerned with promoting health equity than health equality. Health equity is the process of providing vulnerable groups with the necessary tools and opportunities so they may achieve a healthy life like their affluent peers.

This thesis focuses on housing as a determinant of health therefore this chapter will first examine the dimensions of housing that impact health followed by an exploration of the effects of urban planning and environmental justice within neighborhoods on health outcomes. The

⁸⁶ Illinois Department of Public Health, "Understanding Social Determinants of Health," accessed March 25, 2024, <https://dph.illinois.gov/topics-services/life-stages-populations/infant-mortality/toolkit/understanding-sdoh.html>.

⁸⁷ AAFP, "Advancing Health Equity by Addressing the Social Determinants of Health in Family Medicine (Position Paper)," accessed March 25, 2024, <https://www.aafp.org/about/policies/all/social-determinants-health-family-medicine-position-paper.html>.

dimensions and criteria for healthy housing discussed in this chapter will serve as key points of exploration for the case studies analyzed in Chapter 4.

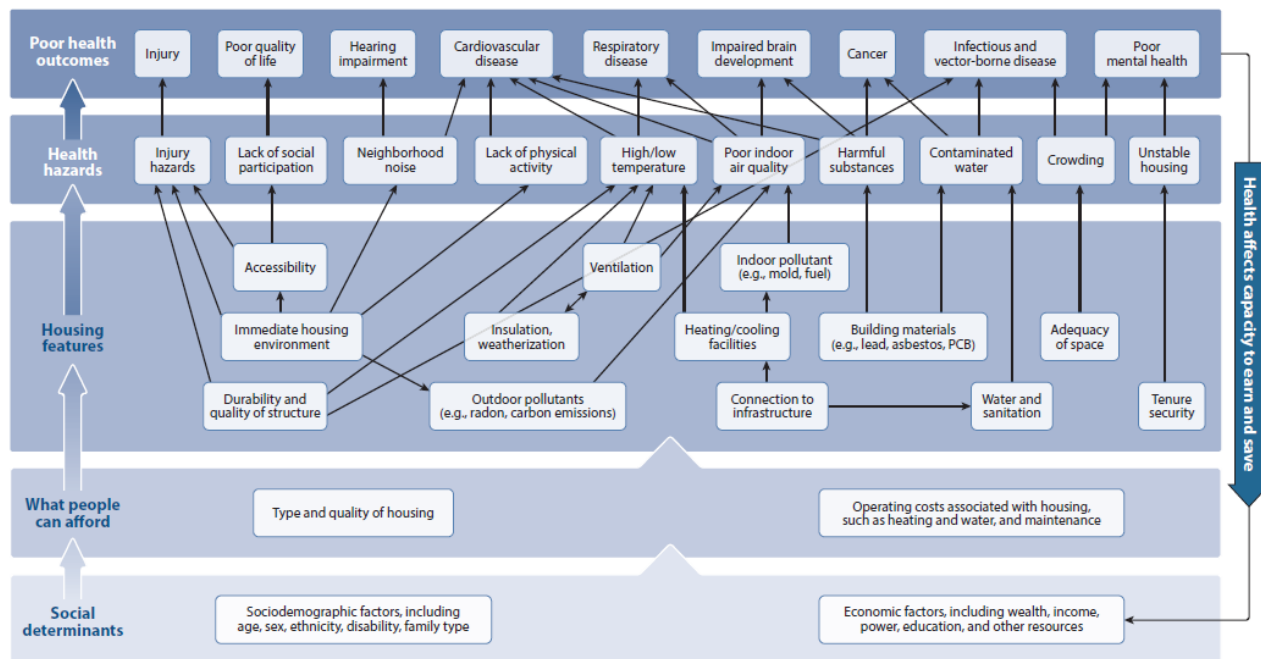


Figure 24: Illustration presenting the various social and economic factors that influence how the quality of housing can impact health outcomes, specifically focusing on respiratory, cardiovascular, and infectious diseases. (Howden-Chapman et al., 2023, page 235).

3.1 Dimensions of Housing

There are four interrelated dimensions of housing that can positively or negatively impact health outcomes:⁸⁸

- Stability
- Quality and safety
- Affordability and accessibility
- Neighborhood environment

Housing instability or insecurity describes the situation where individuals or families are compelled to make involuntary relocations because of housing unaffordability. This situation disproportionately impacts people of color and those residing in disadvantaged communities. There's a strong correlation between housing instability and poor health, where those facing housing insecurity such as difficulty paying rent or mortgages tend to be at more risk of cardiovascular diseases.⁸⁸ This often occurs because housing instability comes with multiple stressors such as hypertension. Moreover, low-income individuals tend to delay medical visits and medications due to their high costs, opting instead to allocate their limited finances towards more immediate necessities such as food and shelter. Those facing housing insecurity are more at risk of mental health disorders such as depression.⁸⁹ According to the National Survey of American Families, individuals facing housing insecurity are more prone to frequent emergency room visits and hospitalizations because they tend to neglect routine checkups and not report

⁸⁸ Mario Sims et al., "Importance of Housing and Cardiovascular Health and Well-Being: A Scientific Statement From The American Heart Association," *AHA Journals*, (2020): 598.

⁸⁹ Hugo Vásquez-Vera et al., "The Threat of Home Eviction and Its Effects on Health Through the Equity Lens: A Systematic Review," *Social Science & Medicine* 175 (2017): 199–208, <https://doi.org/10.1016/j.socscimed.2017.01.010>.

their symptoms,⁹⁰ while secure tenants who are able to establish stability by residing in the same house across several years have reported reduced levels of anxiety and heightened feelings of rootedness and belonging.⁹¹ Another manifestation of housing instability is when people of low-income have to settle for substandard housing which can present health hazards. Substandard housing is characterized by poor ventilation, the presence of toxic materials, limited access to sunlight and exterior areas, as well as damp, pest infested conditions. Such spaces are also deficient in plumbing, heating, electricity, and maintenance. These qualities pertain to the second dimension of housing — quality and safety — which is reported to have the most significant impact on health.

Each year in the United States, two million individuals seek emergency room care for asthma due to triggers such as cockroach allergens, dust mites, and environmental tobacco smoke found in substandard housing.⁹² Additionally, one million young children across the United States have elevated blood lead levels due to exposure to toxic materials, which can negatively impact their intelligence, behavior, and development.⁹² Moreover, two million Americans reside in homes with severe physical issues, while an extra 4.8 million live in homes with moderate problems.⁹² In the 2018 State of Healthy Housing report, nearly 40% of homes in metropolitan areas contained at least one significant health or safety hazard, where the individuals found residing in these substandard dwellings were disproportionately those with of low-income and people of color.⁹³ Black immigrants and African Americans are particularly most impacted by the health

⁹⁰ Margot B. Kushel et al., “Housing Instability and Food Insecurity as Barriers to Health Care among Low-Income Americans,” *Journal of General Internal Medicine* 21, no. 1 (2006): 71–77, <https://doi.org/10.1111/j.1525-1497.2005.00278.x>.

⁹¹ Karl Gustafsson and Nina C. Krickel-Choi, “Returning to the Roots of Ontological Security: Insights from the Existentialist Anxiety Literature,” *European Journal of International Relations* 26, no. 3 (2020): 875–95.

⁹² James Krieger and Donna L Higgins, “Housing and Health: Time Again for Public Health Action,” *American Journal of Public Health* 92, no.5 (May 2002): 758.

⁹³ Raymond, J., Wheeler, W., Brown, M. J., & Centers for Disease Control and Prevention (CDC), “Inadequate and unhealthy housing, 2007 and 2009” *MMWR supplements* 60, no.1 (2011): 21–27.

consequences of substandard housing, as they're 1.7 times more likely to reside in dwellings with significant physical issues.⁹⁴ Inadequate living conditions can also impact the social lives of residents, which in return negatively impacts mental health. The lack of common spaces and a tenant's dissatisfaction with the quality and comfort of their home can lead to self-isolation as residents are less likely to invite their peers into their homes.⁹⁴

A tenant's comfort levels are a result of housing quality and safety which is impacted by thermal insulation, air quality and ventilation, exposure to toxic substances, and maintenance and repair. In substandard housing, thermal insulation is often found lacking and homes are either too warm or too cool, with most residential units lacking air conditioning or relying on outdated and unrepaired forms of heating such as electric baseboards.⁹⁴ Uncontrolled variations in indoor temperature are reported to contribute to an increased risk of developing cardiovascular and respiratory diseases, especially in winter when minimal heating and insulation can lead to incredibly cold interiors.⁹⁵ Moreover, poorly heated homes are susceptible to dampness and humidity which provides a breeding ground for the growth of mold and pest infestations such as mites and roaches which are reported to exacerbate respiratory diseases. This inability to maintain an appropriate home temperature due to inadequately designed insulation systems, high energy prices and the inability of low-income individuals to afford energy costs is defined as fuel poverty and is more likely to cause fatalities during winter in European countries like the United Kingdom.⁹⁶ With regard to air quality and ventilation, it's crucial to provide a clean indoor and outdoor environment for healthy living. Outdoor air quality pertains to the condition of the air in the built environment surrounding the residence, which can be influenced by nearby industrial or

⁹⁴ James Krieger and Donna L Higgins, "Housing and Health: Time Again for Public Health Action," *American Journal of Public Health* 92, no.5 (2002): 760.

⁹⁵ Collins KJ, "Low Indoor Temperatures and Morbidity in the Elderly" *Age Ageing*, (1986): 212–220.

⁹⁶ Borrell C, Espelt A, Rodríguez-Sanz M, Navarro V. "Politics and Health", *Journal of Epidemiology & Community Health* 61 (2007): 658-659.

commercial activities. Historically, low-income individuals and those from disadvantaged communities such as African Americans have resided in neighborhoods with poor air quality, often as a result of being located near highways and airports where air pollution and toxin levels can reach all-time highs as a form of environmental racism. However, according to the Environmental Protection Agency (EPA), indoor air toxin levels are 2 to 5 times higher than outdoor levels and consequently, more impactful to a tenant's health considering people typically spend 70-80% of their time inside their homes.⁹⁷ In 2007, the World Health Organization (WHO) introduced guidelines for adequate ventilation in homes, recognizing indoor air quality as a fundamental human right for all households. In low-income households, a link between poor ventilation and idiopathic pulmonary hemorrhage and cardiovascular diseases was reported, attributable to pollutants such as nitrogen dioxide emitted from the use of biomass, wood, and kerosene stoves for cooking.⁹⁸ Poorly ventilated households can trap pollutants that when accumulated overtime, can reach fatal levels. For instance, prolonged exposure to asbestos, if left unaddressed, can result in conditions like mesothelioma and lung cancer.⁹⁹ Furthermore, higher levels of carbon monoxide from outdated heating systems have been linked to acute intoxication and long-term diseases.⁹⁷ These conditions can have fatal consequences in the presence of overcrowding which facilitates the spread of infection. Chapter 1 has illustrated the historical negative health outcomes linked to overcrowding, however, amid the COVID-19 pandemic, a resurgence of overcrowding conditions has been reported, particularly in low-income households. After the eviction moratoriums in the US were lifted in 2021 — which prevented

⁹⁷ Philippa Howden-Chapman et al., "Review of the Impact of Housing Quality on Inequalities in Health and Well-Being," *Annual Review of Public Health*, (2023): 238.

⁹⁸ Mario Sims et al., "Importance of Housing and Cardiovascular Health and Well-Being: A Scientific Statement From The American Heart Association," *AHA Journals*, (2020): 599.

⁹⁹ James Krieger and Donna L Higgins, "Housing and Health: Time Again for Public Health Action," *American Journal of Public Health* 92, no.5 (2002): 759.

landlords and property owners from evicting tenants unable to afford rent during COVID-19 — low-income households experienced a rise in COVID-19 fatalities and infection rates.¹⁰⁰ This was particularly evident as many residences became overcrowded due to ongoing financial difficulties and employment challenges, preventing them from paying rent. Additionally, poor ventilation in these overcrowded, low-income households exacerbated COVID-19 transmission rates as residents couldn't appropriately socially distance.

Lastly, two other aspects of housing quality that are integral to a tenant's comfort, safety, and health are exposure to toxic substances and the upkeep and maintenance of the property. Building materials such as wall finishes and board and floor coverings which emit volatile organic compounds (VOC) have been linked to asthma and sick building syndrome (SBS), a situation where occupants' health and comfort levels are influenced by their time spent inside a building.¹⁰¹ Furthermore, exposure to toxic chemicals such as radon and lead, which can still be found in outdated apartment buildings, is reported to cause cancer while flooring and textile wall materials that contain polyvinyl chloride were found to be predecessors to bronchial obstruction.¹⁰¹ A study from the National Health and Nutrition Examination Survey (NHANES) revealed that individuals living in residential units dating more than 20 years old that lack significant renovations are at a heightened risk of experiencing strokes, heart failures, and elevated toxin levels in their blood due to exposure to indoor contaminants.¹⁰² This further highlights the significance of maintenance and upkeep to remove existing toxic materials from older residential structures, however, residents from marginalized communities living in

¹⁰⁰ Philippa Howden-Chapman et al., "Review of the Impact of Housing Quality on Inequalities in Health and Well-Being," *Annual Review of Public Health*, (2023): 240.

¹⁰¹ James Krieger and Donna L Higgins, "Housing and Health: Time Again for Public Health Action," *American Journal of Public Health* 92, no.5 (2002): 759.

¹⁰² Mario Sims et al., "Importance of Housing and Cardiovascular Health and Well-Being: A Scientific Statement From The American Heart Association," *AHA Journals*, (2020): 599.

outdated, substandard housing often fear landlord retaliation and thus will refuse to report property damage or put in maintenance requests.¹⁰³

The third and fourth dimensions of housing that impact health are affordability and neighborhood environment. Housing inaccessibility refers to the scarcity of affordable housing which has been linked to negative health outcomes, especially among children from low-income families. Research indicated that these children experience deficient nutrition when compared to their affluent peers due to their families allocating financial resources to more immediate needs such as paying rent.¹⁰⁴ Moreover, substandard, privately-owned housing — which is the only affordable housing to individuals and families of low-income — rarely adhere to current building safety codes and can increase the risk of injuries. Only government housing such as subsidized public housing, is protected by and adheres to stringent housing quality regulations mandated by legislation. This form of housing accommodates approximately 3% of the US population, leaving the rest of the population of lower incomes to settle for substandard housing of poor conditions.¹⁰⁵ In contrast to privately owned housing, subsidized government housing adopt cities' building codes which typically set minimum quality requirements for temperature levels, ventilation, plumbing and electricity, and enforce stringent inspections and penalties in cases of violation.¹⁰⁶ This tradeoff between affordability and housing quality, which is a result of income inequality, contributes to health inequity and severe health disparities in urban areas. Furthermore, outdated residential properties to repel prospective tenants from varying incomes

¹⁰³ Ougni Chakraborty et al., “Housing-Sensitive Health Conditions Can Predict Poor-Quality Housing,” *Health Affairs* 43, no. 2 (2024): 297.

¹⁰⁴ James Krieger and Donna L Higgins, “Housing and Health: Time Again for Public Health Action,” *American Journal of Public Health* 92, no.5 (2002): 759.

¹⁰⁵ Boch SJ, Taylor DM, Danielson ML, Chisolm DJ, Kelleher KJ. “Home is where the health is: Housing quality and adult health outcomes in the Survey of Income and Program Participation”, *Preventive Medicine* 132:105990 (2020): 8.

¹⁰⁶ Ougni Chakraborty et al., “Housing-Sensitive Health Conditions Can Predict Poor-Quality Housing,” *Health Affairs* 43, no. 2 (2024): 297.

into moving to a neighborhood which can limit diversity and availability of public services and amenities. A neighborhood's environment and social conditions are important determinants of health that when neglected, can lead to structural factors that impact health such as residential segregation and gentrification.¹⁰⁷ Segregated neighborhoods, which are predominantly populated with people of color, often have limited economic resources for neighborhood development programs, access to health promoting services such as recreational facilities and organic food stores, and access to high-ranking schools. Studies indicate that disparities in cardiovascular disease (CVD) risk between black and white individuals are less prevalent in communities with higher levels of integration.¹⁰⁷ These conditions pose as serious stressors to health and well-being. Research indicates that segregated communities are among the most economically distressed neighborhoods which can heighten the risk of cardiovascular disease risk factors such as obesity, diabetes mellitus, hypertension, coronary heart disease, stroke, and CVD mortality.¹⁰⁷ Figure 25 and 26 illustrate how socioeconomic status results in health disparities, whereby neighborhoods with severe poverty rates have shorter life spans, with residents experiencing prolonged periods of poor health.¹⁰⁸ Other neighborhood features that impact health and well-being include the physical and social environment such as accessibility to public transportation, connectivity for walkability, public parks, and gardens. Building residential density around said positive neighborhood qualities can benefit the health of residents through promoting physical activity and social cohesion while decreasing risks of heart disease and heart failure.

¹⁰⁷ Mario Sims et al., "Importance of Housing and Cardiovascular Health and Well-Being: A Scientific Statement From The American Heart Association," *AHA Journals*, (2020): 600.

¹⁰⁸ Helen Pineo, *Healthy Urbanism: Designing and Planning Equitable, Sustainable and Inclusive Places* (Singapore: Palgrave Macmillan, an imprint of Springer Nature Switzerland AG, 2022), 15.

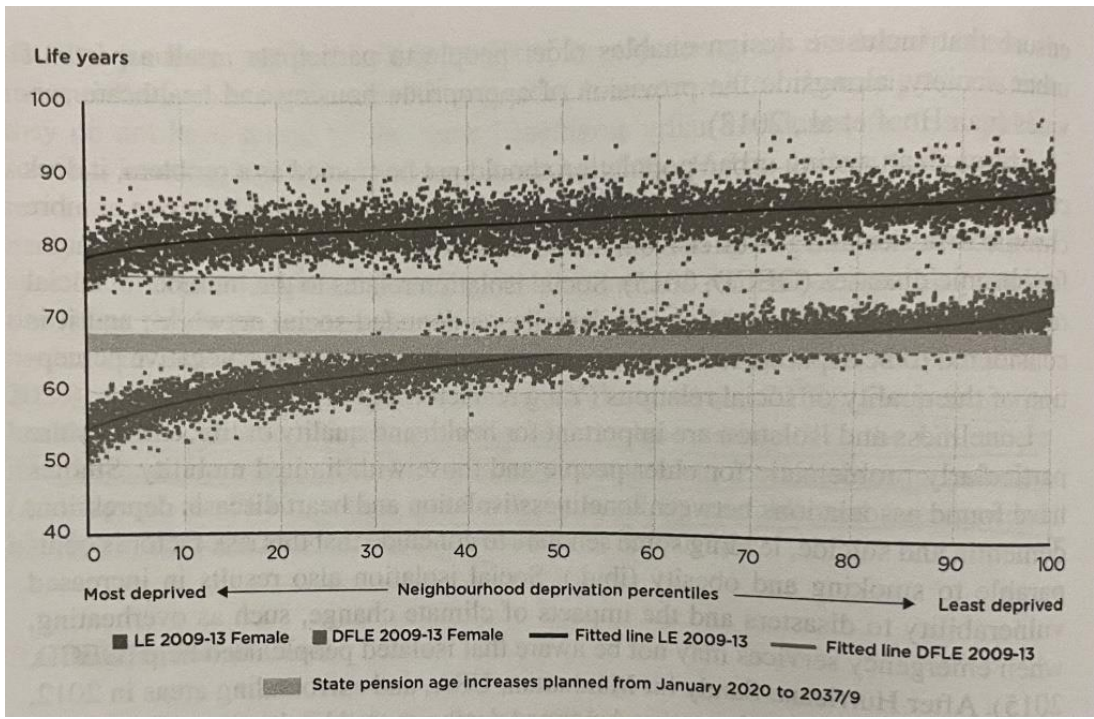


Figure 25: Each dot represents female life expectancy (LE), disability-free life expectancy (DFLE) of a neighborhood. (Pineo, 2022, page 16).

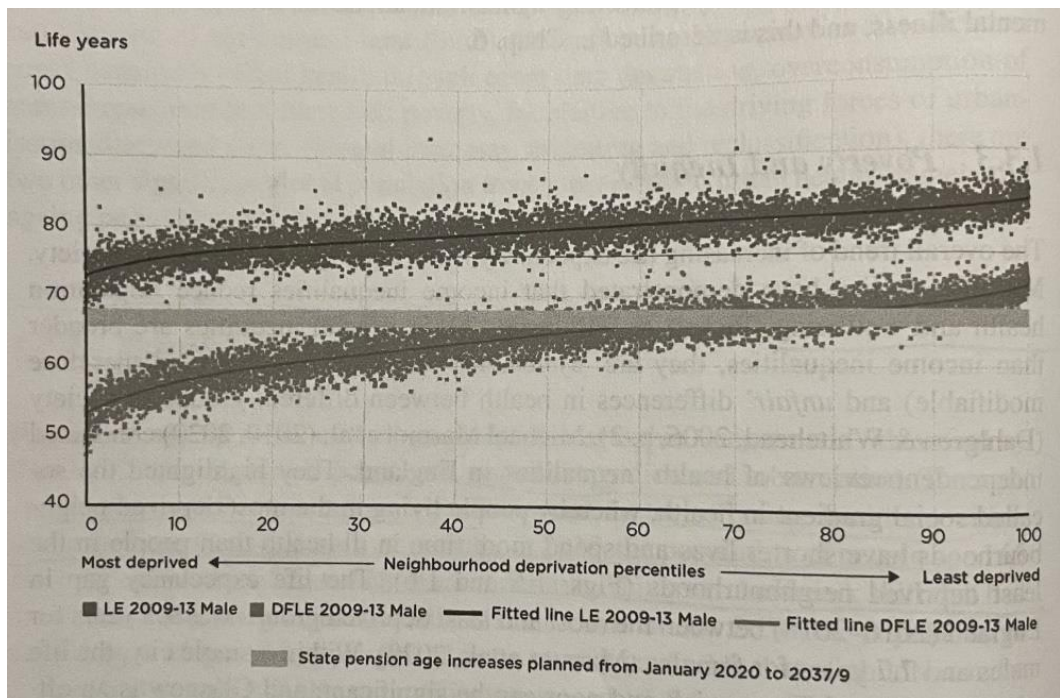


Figure 26: Each dot represents male life expectancy (LE), disability-free life expectancy (DFLE) of a neighborhood. (Pineo, 2022, page 16).

3.2 Environmental Justice and Health

Residential areas are incredibly affected by the state of the natural environment. Historically, health disparities in inner city neighborhoods are exacerbated because of environmental injustice. Unhealthy environmental conditions can have detrimental results on population health and well-being in urban slums, where approximately 29.7% of urban populations in developing regions resided in 2014.¹⁰⁹ The term environmental justice refers to the fair treatment and meaningful involvement of all people regardless of race, ethnicity, income, or educational background in regard to the development, implementation, and enforcement of environmental laws and policies.¹¹⁰ Environmental justice concerns itself with emphasizing equity principles through implementing policies and regulations that ensure minority and low-income populations have equal access to the benefits of, and equal protection from harm with regard to environmental resources. It's important to note that environmental injustice affects low income, minority groups more than their affluent peers. Epidemiological research suggests that most individuals living next to sites with hazardous materials that can cause severe health complications were African Americans, Hispanic Americans, and some Asian Americans.¹⁰¹

Historically, the importance of environmental injustice was realized in 1977 after the chemical contamination of Love Canal, a European American neighborhood in Niagara Falls, New York which was partly built on top of an industrial toxic waste dump where the Hooker Electrochemical Company — now Occidental Chemical Corporation (OXY) — used to dispose of over 21,000 tons of hazardous chemicals between 1942 and 1953, affecting in the process the health conditions of the low-income minority living in that neighborhood. Aside from health

¹⁰⁹ Helen Pineo, *Healthy Urbanism: Designing and Planning Equitable, Sustainable and Inclusive Places* (Singapore: Palgrave Macmillan, an imprint of Springer Nature Switzerland AG, 2022), 19.

¹¹⁰ Erickson, Christina L. "Environmental Justice." *Encyclopedia of Social Work*, (2013): 1

complications such as increased risks of cancers, infant mortality and HIV/AIDS, other challenges environmental injustice presents include resource depletion and degradation issues, loss of access to water in rural areas, low wages and exposure to injury and hazardous materials in unregulated industries. In the book, *Toward a Livable Life: A 21st Century Agenda for Social Work*, the author describes the living conditions of a resident's life in Montgomery Village, a public housing community in Knoxville, Tennessee with high rates of poverty and crime. This location showcases the consequences environmental injustice has on the quality of life in residential areas. The first one being air pollution which residents of the neighborhood have expressed their concerns about a long-standing factory that continues to pollute the air quality of the neighborhood. According to the World Health Organization (WHO), housing and air pollution contribute to 23% of deaths globally.¹¹¹ One resident describes the living standards of Montgomery Village:

“They burn stuff or something... Some days it is really bad over here, and it smothers me to death. I can't come outside sometimes. And I can smell it inside the house.”¹¹²

However, with a predominantly immigrant Latin population, most residents feel politically less empowered to advocate for change. Additionally, the factory is seen as an investment in the neighborhood that hires local residents and provides jobs; but at the cost of the residents' health and lives. Alongside multiple professionals from varying backgrounds in healthcare, environmental sciences, social work, engineering and urban planning, the author of *Toward a Livable Life: A 21st Century Agenda for Social Work* conducted a survey that focused

¹¹¹ Helen Pineo, *Healthy Urbanism: Designing and Planning Equitable, Sustainable and Inclusive Places* (Singapore: Palgrave Macmillan, an imprint of Springer Nature Switzerland AG, 2022), 6.

¹¹² Lisa Reyes Mason, “Achieving Environmental Justice,” essay, in *Toward a Livable Life: A 21st Century Agenda for Social Work*, ed. Mark Rank (Oxford University Press, 2020), 232.

on lower and moderate-income residents. The survey findings were used by the City Sustainable Officer to inform an updated hazard mitigation plan.¹¹³

¹¹³ Lisa Reyes Mason, “Achieving Environmental Justice,” essay, in *Toward a Livable Life: A 21st Century Agenda for Social Work*, ed. Mark Rank (Oxford University Press, 2020), 232.

Chapter 4: 21st Century Case Studies Promoting Healthy Living

This chapter will analyze Via Verde, a housing development by Dattner Architects in the South Bronx located in New York City, and the Mariposa District Redevelopment Masterplan in Denver, Colorado using the four dimensions of healthy housing discussed in Chapter 3. The aim of this chapter is to present successful case studies that apply the four dimensions of healthy housing in designing affordable housing for low-income individuals, emphasizing healthy living and its positive impacts on population health, as well as social and community welfare. Through a comparison between the substandard living conditions uncovered in Chapter 1, it will become apparent that issues of air pollution, overcrowding, access to sunlight and exterior spaces remain important aspects to discuss and consider in low-income housing.

4.1 Via Verde by Dattner Architects, South Bronx, NYC

Completed in 2012, Via Verde — translating to the Green Way — set a new standard for social, healthy, affordable housing. In collaboration with London based architecture firm Grimshaw Architects, Dattner Architects — a New York firm — won the New Housing New York Legacy Competition sponsored by the AIA New York, New York City HPD, NYSERDA and Enterprise Community Partners. The building is arranged around a central courtyard and consists of 20 stories that make up a series of stepped roofs which transform from a low rise building to a high-rise building (Figure 27). Via Verde was one of the first affordable housing developments in New York City and in the United States to incorporate mixed used facilities and accessible green roofs and gardens. Sustainability was one of the main objectives of the project and Via Verde was able to achieve LEED Gold certification by the time of its completion. This section of the chapter will discuss how Via Verde addressed each dimension of healthy housing — stability, affordability and accessibility, quality and safety, and neighborhood environment —

through insights from an interview with William Stein, principal architect of the project at Dattner Architects at the time.



Figure 27: Via Verde. Image provided by William Stein, Dattner Architect's principal architect of Via Verde.

The previous chapter presented the health risks associated with housing instability and insecurity experienced by low-income individuals such as cardiovascular diseases, hypertension, and undiagnosed acute diseases resulting from a lack of regular medical checkups due to high medical costs. Housing instability is the result of the disparity between income and cost of living which has proven to have catastrophic results on population health. The project's affordability and accessibility allowed residents to feel a renowned sense of security and stability. When I asked Stein how Via Verde maintained its affordability and avoided speculative owners, especially considering that the apartment units in the building are either affordable rentals or ownerships units, he explained that the building was rent controlled by the city and that apartment owners weren't allowed to sublet their apartments. Moreover, the rent-controlled

apartments were fixed according to income level by the city, not by the developer. This protected housing insecure residents from developers arbitrarily raising the rents. In the case of ownership units, the ownership agreement at the time of purchase included a clause that stipulated residents weren't allowed to sublet their apartments and if the apartment owners decided to sell their units, they must sell the property at a fixed rate regulated by the city so the building can maintain its affordability. Stein elaborated that contrary to public opinion at the time, Via Verde's sustainable and healthy living features were incorporated with little or no additional construction costs which allowed the rents and ownership prices to remain affordable to low-income residents. This was mainly achievable due to the multitude of financial sources the project received, including but not limited to low-income housing tax credits and various direct public subsidies from the city of New York. The financial and political support Via Verde garnered allowed Dattner Architects and the developers to achieve their vision of sustainable healthy living within affordable housing, proving that high quality housing can be achieved without exuberant costs. This comes in contrast to the garden city movement discussed in Chapter 2, which unveiled the struggle city planners and architects had at the time for providing healthy, safe housing for industrial workers that was affordable and within their limited budget.

Via Verde was developed by a non-profit developer, Phipps Houses, and a for-profit developer, Jonathon Rose Companies, who are active affordable housing developers in New York City. Dattner Architects and Grimshaw Architects were able to achieve sustainable design approaches and use healthy materials by working with experienced developers who possessed valuable insights from past affordable housing projects. Chapter 3 uncovered the importance of housing quality and safety on tenant health. Thermal insulation, air quality and ventilation, exposure to toxic substances and maintenance and repair are all critical factors to indoor comfort

levels. Stein explained in affordable housing, most of the available materials for flooring that are within the budget contain vinyl, which have proven to emit toxic chemicals. However, in Via Verde, they were able to move towards healthy, nontoxic materials and move away from PVC or vinyl materials through utilizing oak flooring (Figure 28). The ability to specify real wood flooring for an affordable housing development was unusual at the time because of its high cost and wouldn't have been possible without the support of New York City government and local AIA chapter. In terms of ventilation, Via Verde provided ceiling fans in addition to air conditioning in the living rooms. All the apartment units in the building have some degree of cross ventilation, such as having windows in more than one direction to allow natural ventilation. Additionally, attention to adequate insulation to regulate and maintain the tenants' thermal comfort were important aspects to the quality and safety of Via Verde. Stein explained that one of the most innovative features of the project were the exterior walls which were prefabricated in a factory in Long Island. The rain screen panel system comprised of metal and cement board panels with wood panel accents (Figure 29). The prefabricated system was shipped to the site as a complete package, including windows, balconies, and sunshades, and lifted in place by a crane. This approach had many advantages in shortening the construction period by enclosing the building very quickly. Stein stated that having prefabricated exterior walls allowed for a highly insulated building envelope because the insulation was properly installed under factory conditions with quality assurance, resulting in a very air-tight and watertight exterior for the building. This only added to the comfort of the residents and the efficiency of the building.



Figure 28: A living room of one of the apartments in Via Verde. Image provided by William Stein, Dattner Architect's principal architect of Via Verde.

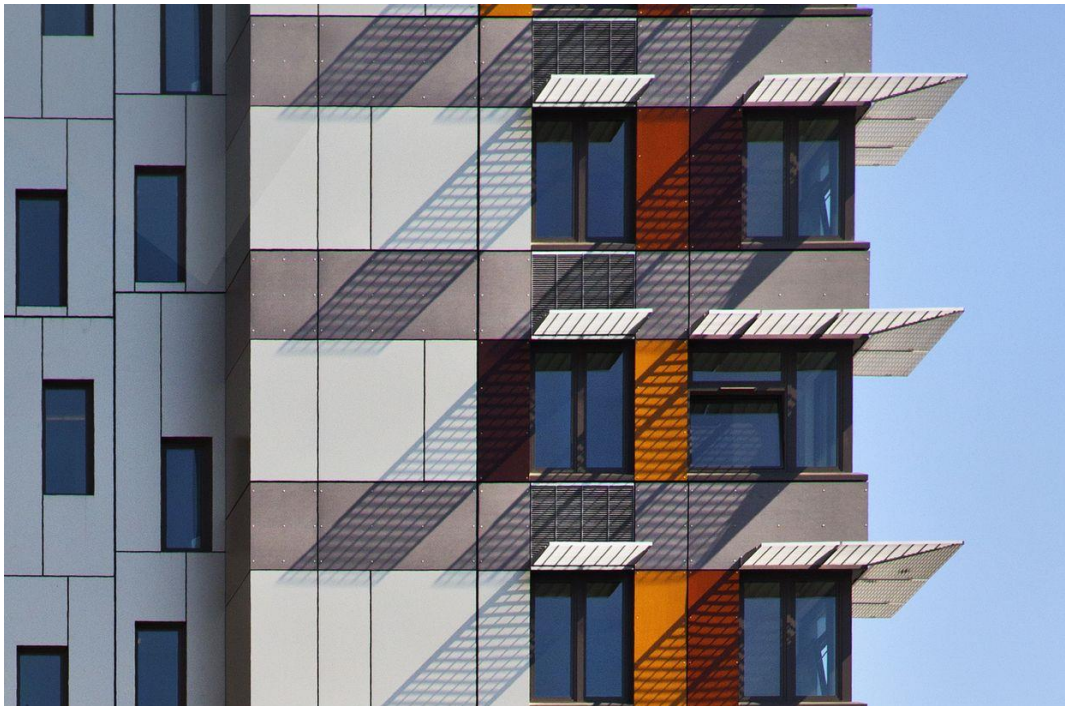


Figure 29: Via Verde's prefabricated rain screen façade system. Image provided by William Stein, Dattner Architect's principal architect of Via Verde.

Many of the elements incorporated in Via Verde have now become standard in affordable housing. For example, programmatically, Via Verde was the first affordable housing

development in New York City to promote conditions that lead to positive physical and mental health through providing a fully equipped fitness center on site for use by the residents and a garden for the residents to grow vegetables (Figure 30). Stein explained that for the first few years of Via Verde, a group named Grow NYC that operates green markets in New York City provided mentoring for the residents. Since then, the residents have opened a gardening club that operates the community gardens. In Chapter 2, although the garden city movement couldn't maintain affordability for the low-income working class it sought to serve, it implemented and emphasized similar exterior facilities to promote positive physical and mental health in social, cooperative housing such as the inclusion of common gardens, tennis courts, and croquet lawns in Homesgarth. Other social spaces in Via Verde for residents to use were the green roofs. The idea to arrange the building as a series of steps transforming from low rise to high rise allowed for the creation of green roofs, some of which are for active recreation and some of which are passive. The series of green, landscaped roofs gave the project its name, Via Verde or 'the green way'. The stepped design also resulted in a more dynamic visual expression to the project and allowed for the installation of solar panels on the south facing walls. The passive green roofs are allocated to the higher levels, starting from the seventh floor to the twentieth floor, and have all the benefits of insulating the roof and stormwater control without being accessible to the residents. The twentieth floor which is the top floor, includes a community room for use by the residents, as well as an outdoor roof terrace with views overlooking the south of Manhattan. On the other hand, the active roofs can be found on the lower roofs starting from the first level to the seventh floor, with a courtyard on the ground level which is accessible to all the residents. The availability of beautifully landscaped common spaces allows residents to invite their peers into the building and their homes, leading to decreasing rates of self-isolation and improvements in

social and mental well-being. Moreover, Via Verde's commitment to positively improving the health of their residents can be seen in the inclusion of a healthcare facility as part of the project design. The healthcare facility is administered by Montefiore hospital, a local New York City hospital. The clinic is open to the residents and the surrounding South Bronx community which is a largely low-income community. This approach of including mixed use programs as part of affordable housing developments is aimed at partially serving the residents but primarily integrating the projects within their surrounding community. The availability of mixed-use programs attracted people of varying mixed income levels to Via Verde, which aided in the diversity and revitalization of the project.



Figure 30: Via Verde's roof garden. Image provided by William Stein, Dattner Architect's principal architect of Via Verde.

Lastly, the qualities found within the neighborhood environment and outside the housing units are equally as important in creating safe, healthy neighborhoods. Stein described the

existing site condition before the construction of Via Verde as a brownfield. He explained that it was an industrial site with a freight rail line running through it and that the site was contaminated and needed environmental remediation to facilitate the removal of contaminated soil before construction can begin. It is no surprise that the South Bronx has many brownfields as the result of previously existing industrial programs. The South Bronx is one of the poorest census tracts in the United States and is predominantly inhabited by African Americans, so environmental degradation because of environmental injustice, as discussed in the previous chapter, is to be expected. It's more common for low-income, people of color to be affected by severe health complications as a result of environmental injustice and hazardous materials and toxins than any other population.¹¹⁴

To approach such a diverse neighborhood in an appropriate manner, Stein mentioned that the designers and developers had multiple meetings with the New York City Department of Planning, and The New York City Department of Housing, Preservation and Development, The Department of Buildings, and other public agencies. Although there were no specific measures in Via Verde to upgrade the general neighborhood, Dattner Architects did consult with the city agencies and local community board and met with representatives of the community numerous times to acquire their input on what they felt would work. The developers and designers on the project learnt that the community values safety in the project because of security issues within the neighborhood. As a response, the developers required one entry into Via Verde rather than multiple entries to the building. While multiple entries can enhance activity along the street frontage, a singular point of entry enables the developer to allocate resources for a full-time concierge at the front desk, thereby enhancing safety measures. Moreover, requiring all the

¹¹⁴ Helen Pineo, *Healthy Urbanism: Designing and Planning Equitable, Sustainable and Inclusive Places* (Singapore: Palgrave Macmillan, an imprint of Springer Nature Switzerland AG, 2022), 9.

residents to enter through the same point of entry adds to the social connections and the sense of security.

It is important to note that although the site surrounding Via Verde suffers from high rates of crime, there is still a vibrant community to be found within the neighborhood. Stein recalled a major street named 3rd Avenue just one street over from Via Verde, which is one of the main shopping streets in the Bronx, characterized by its lively restaurants, stores, and pedestrian traffic. He added that Via Verde was able to revitalize the urban block further. Soon after Via Verde's completion, the city of New York was also in the process of finishing a series of buildings just to the south of Via Verde with the aim of filling in the other vacant properties (Figure 31). Over the last 15 years, the creation of Via Verde has ushered in many new developments ranging from mixed used to housing that have helped make the neighborhood somewhat safer.



Figure 31: The retail intersection known as the Hub, a vibrant commercial street, which is accessible one block to the west of Via Verde. Image provided by William Stein, Dattner Architect's principal architect of Via Verde.

When reflecting on the reason behind Via Verde's success and the building's ability to maintain its quality, Stein stated that maintenance, repairment and upkeep was the key. According to Stein, Dattner Architects was fortunate to work with Phipps Houses as the developer. Ever since Via Verde opened its doors to residents in 2012, Phipps Houses has overseen the property management and all things related to maintenance such as HVAC, plumbing, and landscaping. Stein emphasized the importance of maintaining, preserving, and renewing the existing housing stock within affordable housing, all of which have been integral factors to the betterment of low-income housing since as early as the 18th century. Similarly to Via Vere, the Big Flat mentioned in Chapter 1 was situated within a poor, crime-ridden neighborhood. As discussed in Chapter 1, the Big Flat, a late 19th-century New York City tenement, intended to improve living conditions for the working class and foster social rehabilitation among them, but was ultimately demolished to make space for a factory after it fell into disrepair. In the Big Flat, the neglect of the landowners in providing adequate property management led to slum conditions which facilitated the spread of diseases and increased crime. The phenomenon of demolishing deteriorating apartments to create room for commercial properties remains relevant within the realm of affordable housing even today. Without the financial, political, and community support that Via Verde garnered during its construction and post-occupancy, the building would have struggled to uphold its high standards of quality and safety. Developers, architects, and professionals concerned with the built environment must all put their efforts towards maintaining the existing housing stock to stop the gentrification of once vibrant, urban neighborhoods.

4.2 Mariposa District Redevelopment, Denver, Colorado

The move towards healthier housing and as a result, healthier cities has been a primary goal of many international organizations and local governments, especially when considering the increasing risk of epidemics and the consequences of climate change. In the United States, a recent significant stride towards creating healthy, affordable housing that integrates sustainability and social equity, while ensuring accessibility across varying income levels, is exemplified by the Mariposa District Redevelopment Masterplan in Denver, Colorado. The redevelopment covers 17.5 acres and runs between West Ninth and 11th avenues, east of the Osage and 10th light rail station and west of Mariposa Street (Figure 32).¹¹⁵ Mariposa was developed following the conditions and outcomes outlined in the Mariposa Healthy Living Toolkit, a planning tool developed by the Denver Housing Authority (DHA) and Mithun design firm that utilizes population health data and research to set guidelines for the incorporation of health into design, redevelopment, and construction (Figure 33).¹¹⁶ The development began in 2009 and was completed by 2017 with the aim of improving the health of the residents through responding to the Social and Structural Determinants of Health (SSDOH), described in Chapter 3. The SSDOH include living conditions, economic stability, education, discrimination, and access to housing or medical services. This implies that improving local health can only be met through improving the conditions which people live in. Using the SSDOH, the Mariposa Healthy Living Toolkit established six dimensions that constitute a healthy community which they used as points of evaluation:

- Healthy Housing
- Sustainable and Safe Transportation

¹¹⁵ “Mariposa”, Denver Housing Authority, accessed April 16, 2024, <https://www.denverhousing.org/mariposa/>.

¹¹⁶ Mithun, *The Mariposa Healthy Living Toolkit: A Comprehensive Guide* (2012): 5.

- Environmental Stewardship
- Social Cohesion
- Public Infrastructure (services and amenities)
- Healthy Economy



Figure 32: Masterplan of Mariposa redevelopment district developed by Mithun design firm. Image found in Mithun website.¹¹⁷

¹¹⁷ “Mariposa South Lincoln Redevelopment Master Plan”, Mithun, accessed April 16, 2024, <https://mithun.com/project/mariposa-south-lincoln-redevelopment-master-plan/>.

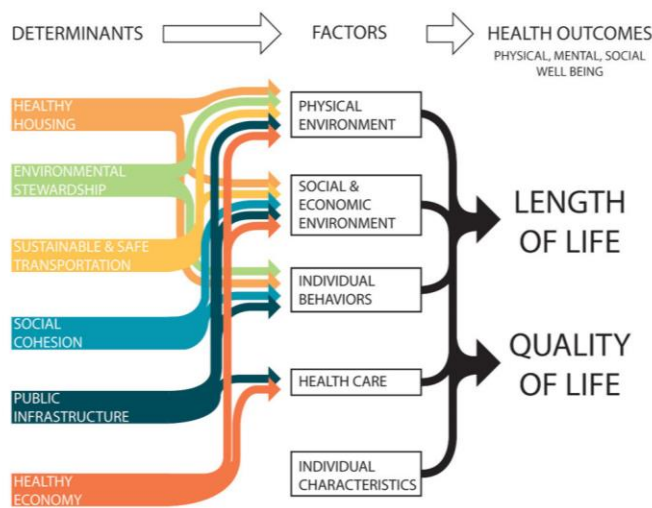


Figure 33: Diagram of the Mariposa Healthy Living toolkit developed by Mithun design firm. Image found in Mithun website.¹¹⁸

Although Mariposa was developed on the site of a demolished public housing project, it was still able to retain 48% of the previous tenants because of the masterplan's goal of providing housing for varying income levels through offering affordable housing and market rate housing.¹¹⁹ Moreover, Mariposa was phased out in three phases across seven years to mitigate the displacement of the families, individuals and elderly who lived in the previous public housing project. Completed in 2013, Phase 1 was named The Tapiz and introduced 100 public housing units serving elderly and disabled individuals and families; while Phase 2, named The Arches, included 93 rental units targeted towards low-income individuals, especially the residents of the previously existing public housing project.¹²⁰ Lastly, Phase 3 contained 87

¹¹⁸ "Mariposa Healthy Living Initiative", Mithun, accessed April 16, 2024, <https://mithun.com/project/mariposa-healthy-living-initiative/>.

¹¹⁹ Elizabeth Cooper, "Mariposa," Healthy Urbanism, June 13, 2022, <https://healthyurbanism.net/mariposa/>.

¹²⁰ "Mariposa", Denver Housing Authority, accessed April 16, 2024, <https://www.denverhousing.org/mariposa/>.

market-rate, public housing, and privately managed rental units by 2013 while 800 subsequent housing units were added and completed by 2017 (Figure 34).¹²¹



Figure 34: Mariposa. Image found in Denver Housing Authority website.¹¹³

The site was especially integral to the success of Mariposa because of its accessibility to nearby public transportation. In addition to residential space, Mariposa introduced commercial and recreational spaces such as playgrounds and gardens. Phase 1 contained 8,000 square feet of commercial space that was occupied by DHA offices, a culinary training school, a computer lab, a nonprofit organization, and community meeting space; Phase 2 included 5,500 square feet of commercial space; Phase 3 allocated 11,000 square feet for commercial space.¹²¹ By including mixed-use programs and enhancing access to physical, economic, and social amenities, Mariposa was able to rehabilitate an entire neighborhood and improve the local health of residents. Some

¹²¹ “Mariposa”, Denver Housing Authority, accessed April 16, 2024, <https://www.denverhousing.org/mariposa/>.

of the initiatives that Mariposa implemented to promote healthy living was the inclusion of a healthcare clinic and a fitness center. The Denver Housing Authority maintained ownership of all 17.5 acres of Mariposa through development and post-occupancy which enabled them to meet their goal of promoting healthy living.¹²² Through annual post-occupancy surveys conducted by the DHA, Mariposa demonstrated the following progress in achieving some of the positive trends identified within the six dimensions of a healthy community, as outlined by the Mariposa Healthy Living Toolkit:¹²³

- Residents of the La Alma/Lincoln Park and Auraria neighborhoods felt more secure and safer as crime rates decreased from 246 per 1,000 people to 157 per 1,000 people between 2005 and 2011.
- After the completion of phase 1, residents of the La Alma/Lincoln Park and Auraria neighborhoods were able to decrease their commute time from 24 minutes in 2010 to 20 minutes in 2012.
- With the development of Mariposa, access to adjacent natural, exterior, open space within a half mile of residential units increased to 32%.
- 38% of the residents occupying the first phase of Mariposa found their health had improved.
- With improved housing quality and an overall walkability score of 81 through access to public transport, and improved pedestrian and cycling routes that enhanced physical health, Mariposa decreased the rates of residents using hospital emergency departments as primary care and fewer 911 calls.

¹²² “Denver’s Mariposa District: Supporting healthy, mixed-income living”, HUD USER, accessed April 16, 2024, https://www.huduser.gov/portal/pdredge/pdr_edge_inpractice_022414.html.

¹²³ Elizabeth Cooper, “Mariposa,” Healthy Urbanism, June 13, 2022, <https://healthyurbanism.net/mariposa/>.

- In 2012, the Mariposa District redevelopment was recognized by the Environmental Protection Agency (EPA) with the National Award for Smart Growth Achievement in the Equitable Development Category for the project's "creative, sustainable initiatives that help protect the health and the environment of communities while also strengthening local economies".

Conclusion

In this thesis, I propose that professionals involved in affordable housing — such as designers, developers, and planners — should adopt a public health-oriented strategy. This approach integrates insights from epidemiological and medical research, as well as expertise from public health professionals, social scientists, and psychologists, to address healthy housing dimensions effectively. By doing so, we can mitigate the structural, social, and environmental factors that disproportionately affect the health of low-income and disadvantaged urban dwellers.

In tracing industrial working-class housing in Manchester, it becomes apparent the significant impact urban growth, housing quality and neighborhood environment can have on public health. From the growing cotton and textiles industry in the late 18th century to the transition towards factory manufacturing in the Ancoats district, housing types adapted to accommodate the changing workforce and the influx of workers migrating from rural towns. Workshop dwellings, once integral to the textile industry, gave way to new forms like back-to-backs, cellar dwellings, and court houses to meet the demands of industrialization. However, this rapid development lacked adequate regulations, leading to overcrowding and declining housing quality, particularly in areas like Ancoats, Little Ireland, and Angel Meadow. Legislative interventions from local governments and public health professionals in the mid-19th century marked a turning point, aiming to improve housing standards and public health. Similarly, in New York City, the influx of immigrants fueled a housing crisis, resulting in the proliferation of tenement housing and dire living conditions as displayed in Riis' *How the Other Half Lives: Studies among the Tenements of New York*. The example of the Big Flat, a once-promising tenement that was demolished to make room for a factory, highlights the significance of factors beyond building regulations influencing the living standards and health of the working class. It

emphasized the importance of considerations such as site location, ongoing maintenance, and effective property management. In Chapter 4, William Stein, the principal architect of Via Verde, echoed similar sentiments, stressing that maintenance and property management are crucial for upholding the quality of affordable housing and preventing its deterioration into slum-like conditions.

The rise of the Garden City movement marked the initial significant shift in focus towards prioritizing the health and welfare of inhabitants, particularly those belonging to the working class. The Garden City movement, created by Ebenezer Howard, addressed social and community welfare through careful planning, separation of industrial and residential zones, and provision of public amenities. Letchworth, the first Garden City, exemplified these ideals through its zoning regulations, emphasis on green spaces, and cooperative housing initiatives. The movement proved that urbanization and positive physical, mental, and social health can coexist. However, despite its success, the movement faced challenges in providing affordable housing for the working class it aimed to benefit, leading to issues of segregation and exclusion. However, the principles of health-centered urban planning demonstrated in Letchworth and other Garden Cities continue to influence contemporary urban development strategies. When detailing the dimensions of healthy housing discussed in Chapter 3, it's apparent the Garden City movement was ahead of its time in addressing the housing and environmental factors impacting population health, such as addressing overcrowding and promoting quality social housing and neighborhood layouts conducive to mental and physical well-being.

The Garden City movement aided in understanding housing as a determinant of health, as it intersects with social and structural determinants to shape individual and population health outcomes. Chapter 3 described the dimensions of housing, including stability, quality and safety,

affordability and accessibility, and neighborhood environment. Housing instability, substandard housing conditions, and housing inaccessibility disproportionately affect marginalized communities and contribute to health inequities. Moreover, environmental justice issues further exacerbate health disparities, particularly impacting low-income and minority populations. Addressing these challenges requires comprehensive interventions that prioritize health equity over equality, considering the complex interplay of social, economic, and political factors shaping housing and neighborhood conditions. In Chapter 4, the thesis presents Via Verde in New York City and Mariposa District Redevelopment Masterplan as contemporary case studies that exemplify the application of the four dimensions of healthy housing — stability, affordability and accessibility, quality and safety, and neighborhood environment — outlined in Chapter 3

Via Verde, with its innovative design and sustainable features, demonstrates how affordable housing can be achieved without sacrificing quality or accessibility. Through partnerships with experienced developers and financial support from various sources, Via Verde not only provided affordable housing but also incorporated amenities such as fitness centers, gardens, and healthcare facilities, contributing to the well-being of its residents and the surrounding community. Similarly, the Mariposa District Redevelopment utilized the Mariposa Healthy Living Toolkit to integrate health considerations into its design and construction process. By providing a mix of affordable and market-rate housing, along with commercial and recreational spaces, Mariposa revitalized the neighborhood and improved the overall health and safety of its residents. These case studies highlight the importance of collaboration between architects, developers, government agencies, and communities to create sustainable, healthy, and inclusive urban environments. By prioritizing the needs of low-income individuals and

addressing social determinants of health, these projects serve as models for future urban development initiatives aimed at promoting population health and well-being.

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