Landmarks Preservation Commission June 24, 2003, Designation List 348 LP-2135

WILLIAMSBURG HOUSES, 142-190 Leonard Street, 163-213 Manhattan Avenue, 202-254 Graham Avenue, 215-274 Humboldt Street, 122-192 Bushwick Avenue, 83-221 Scholes Street, 86-226 Maujer Street, 88-215 Stagg Walk and 88-202 Ten Eyck Walk, Brooklyn. Built 1935-38; Williamsburg Houses Associated Architects: Richmond H. Shreve, chief architect; William Lescaze, designer.

Landmark Site: Borough of Brooklyn Tax Map Block 3025, Lot 46; Block 3026, Lot 1; Block 3027, Lot 1.

On June 17, 2003 the Landmarks Preservation Commission held a public hearing on the proposed designation of the Williamsburg Houses and the proposed designation of the related Landmark Site. The hearing had been duly advertised in accordance with provisions of law. Four people spoke in favor of designation, including representatives of the New York City Housing Authority, Municipal Art Society, New York Landmarks Conservancy, and Historic Districts Council. Letters in support were also received from State Assemblyman Vito J. Lopez, 53<sup>rd</sup> Assembly District and New York/Tristate DOCOMOMO. The Commission previously held a public hearing on the Williamsburg Houses (LP-1252) on August 11, 1981 and November 10, 1981.

# Summary

A collaborative project of the Federal Public Works Administration and the newly established New York City Housing Authority, the Williamsburg Houses are notable as one of the earliest housing developments in the United States to reflect the ideas of the modern movement in architecture. In the 1920s Williamsburg was one of the most densely populated sections of Brooklyn and nearly six hundred, mostly frame, structures were demolished to create the 23.3 acre site. Proposed in 1934, this residential complex was skillfully designed by the Williamsburg Associated Architects during 1935 and most units were occupied by 1938. The partnership included Richmond H. Shreve, of Shreve, Lamb & Harmon, the architects of the Empire State Building, and William Lescaze, the Swiss-born architect who helped introduce the "International" style on the eastern seaboard. Lescaze was responsible for the design, which includes twenty 4-story structures on four "super" blocks turned at 15 degree angles to the street grid. Oriented to the sun and prevailing winds, this unusual layout produced a series of large and small courts, many of which flow into a large public space at the center of each block. A light-colored palette distinguishes the facades, executed in tan brick and exposed concrete. Among the most prominent features are the entrances, marked by blue tile and projecting stainless steel canopies, and the handsome streamlined storefronts. The complex was widely discussed by contemporary critics and more than 25,000 New Yorkers applied for 1,622 apartments. During the mid-1990s, the buildings underwent an extensive restoration which included the replacement of all exterior materials. Sponsored by the Housing Authority, in consultation with the Landmarks Preservation Commission, these alterations were remarkably sensitive and in the 4th edition of the AIA Guide to New York City the "revivified" complex was called "the best public housing project ever built in New York."



#### DESCRIPTION AND ANALYSIS

# Housing the Masses<sup>1</sup>

From the rowhouse to the apartment building, New York City has been a laboratory for innovative housing. Beginning after the Civil War, apartments, variously known as French Flats and tenements, were built to house the city's surging population. Immigrants, for the most part, crowded into unregulated tenements, structures that maximized profits for developers while providing few amenities that we take for granted today, such as light, air, and private bathrooms. Despite government efforts to legislate minimum standards in 1867 and 1879, initially private individuals took the most significant steps to make decent housing affordable to all. Several pioneering examples were located close to the Brooklyn waterfront, including the Home and Tower Buildings (William Field and Son, 1876-78), the Astral Apartments (Lamb & Rich, 1885-87) and Riverside (William Field and Son, 1890).<sup>2</sup> The later complex surrounded a large tree-shaded courtyard incorporating a music pavilion and areas for drying laundry. Despite these, and a few innovative Manhattan developments, the majority of New Yorkers continued to live in substandard conditions. The passage of the New Tenement Law in 1901 improved the situation, requiring that multiple dwellings be built on significantly larger lots, with fire escapes and separate "privies" for each family. After World War I, the garden apartment came into vogue. While most were built for the middle class, especially in Jackson Heights, a significant group were sponsored by unions and cooperative organizations that wished to provide members with inexpensive apartments. Significant examples include the Amalgamated Houses (Springsteen & Goldhammer, 1930) on Manhattan's Lower East Side and the "Coops" built in the Bronx by the United Workers Cooperative Association (Springsteen & Goldhammer, 1925-27; Herman Jessor, 1927-29).

The first significant act of government intervention occurred in 1926 with the passage of the New York State Housing Law. Promoted by Governor Alfred E. Smith to encourage construction through the formation of local authorities that would sell bonds or seek federal funds, it had little impact until 1934 when the New York City Housing Authority (NYCHA) was established. The authority's first project, aptly called the First Houses (Frederick L. Ackerman, 1934-36), was located in Manhattan's East Village. Begun as a rehabilitation program involving the demolition of every third

structure, due to structural problems the eight brick buildings were entirely rebuilt.<sup>3</sup>

Throughout the early Depression, government-subsidized housing remained a controversial issue. Consequently, it was first promoted as worker relief, organized to create jobs but not compete with the commercial market. The first federal agency to involve itself with housing was the Reconstruction Finance Corporation (RFC) which was created in 1932 to provide low-interest loans to limited-dividend housing corporations. Of the two loans it made, one was toward the construction of Knickerbocker Village (John S. Van Wart & Frederick L. Ackerman, 1933). Built for the Fred F. French Company, this Chinatown-area development consists of two 12-story buildings, both enclosing an interior courtyard.

In mid-1933, as part of Franklin Delano Roosevelt's New Deal, the Housing Division of the Public Works Administration (PWA) was established. What made this agency different from its predecessor, the RFC, was that it would be directly involved in the planning and construction of low-income housing. The program was a great success and over the next three and half years it collaborated on the design and construction of 51 projects in 36 cities, including the Harlem River Houses<sup>4</sup> and the Williamsburg Houses. The passage of the Wagner-Steagall Bill (aka U.S. Housing Bill) by the United States Congress in September 1937, strengthened the federal government's commitment to housing, but shifted greater control to local authorities. The first New York City housing project to be financed under this program was the Red Hook Houses (Electus Litchfied, chief designer, 1938-39) in Brooklyn. Future construction, which would amount to more than half a million low-rental units nationwide by 1957, would be funded primarily through low-interest loans.

#### Site

The Williamsburg Houses are located in northwestern Brooklyn, approximately one mile east of the Williamsburg Bridge and two blocks south of Grand Street, a lively commercial thoroughfare. Founded as part of the town of Bushwick in the mid-17th century, Williamsburg was incorporated as a village in 1827. The community prospered and by 1852 it was the 20<sup>th</sup> largest city in the nation. Three years later, Williamsburg became part of Brooklyn and was commonly referred to as the Eastern District. Although ferry service was important to the

area's development, it was the planning and construction of a second East River crossing, the Williamsburg Bridge, that caused the most dramatic growth. Proposed in 1883, the bridge was completed with much fanfare in 1903, serving pedestrians, bicycles and horse-drawn vehicles. In subsequent decades, Williamsburg rivaled the Lower East Side in population and density. The *Brooklyn Eagle* claimed in 1920 that the bridge was part of the busiest traffic center in the nation and that a single block north of it was the most crowded in the world.<sup>5</sup> Conditions in the neighborhood continued to deteriorate throughout the decade, so much so that the population began to decline.

In October 1933, the Federal Works Administration (PWA) established a slum clearance committee to study conditions throughout New York City. Richmond H. Shreve, who would later serve as chief architect of the Williamsburg Houses, was named director. Based on the committee's recommendations, \$25 million was set aside for a housing program in New York City. Under the direction of the NYCHA, a more comprehensive study was undertaken in 1934, focusing on fourteen neighborhoods, including Williamsburg. The PWA reported:

When the study was completed the blighted slum area of the Williamsburg section stood out as the best example where the most good could be done in wholesale clearance work.<sup>6</sup>

Of 93 blocks studied, a grid of 12 was identified for redevelopment in Williamsburg. These blocks were chosen because property values were relatively low and the owners were willing to sell. Most of buildings were mixed-use, incorporating retail spaces at ground level and apartments above. Each lot was carefully documented: 90% of the structures were at least forty years old, 70% were built of wood, 78% had no central heating, and 67% had no private toilets. Such statistics were used to paint an extremely bleak picture of life there:

But the Williamsburg section of Brooklyn, according to official surveys, is unique in that its slums bear the stamp of dull listlessness and despair . . . Laissez faire, exploitation, and land speculation have robbed the community of its natural potentialities for development and orderly urban life.<sup>7</sup>

Public amenities were also in short supply; there were few schools and there were almost no parks.

#### Architects

Five architects were appointed to the NYCHA's architectural board in May 1934: Richmond H. Shreve (1877-1946) of Shreve, Lamb & Harmon, Matthew W. Del Gaudio (1889-1960), William Lescaze (1899-1969), Arthur C. Holden (1890-1993), and James F. Bly. As members of the board, their initial role was advisory. They would act as the authority's chief architect, overseeing the design and construction of municipal housing citywide. In June 1934 an open competition was held to choose the architects who would work on the Williamsburg Houses and other NYCHA projects. 8 The program guidelines did not specify the location, but the grid chosen closely resembled the long blocks where the Williamsburg Houses would be built. Of 278 architects who participated, 5 of the 22 selected were assigned to the Brooklyn project: Samuel Gardstein, of Holmgren, Volz & Gardstein, G. Harmon Gurney (b. 1896), of Gurney & Clavan, John W. Ingle Jr., Paul Trapani (1887-1974), and Harry Leslie Walker (1877-1954).9

In June 1935, a contract was signed with the Williamsburg Associated Architects. The partnership consisted of ten men: the five architects selected by jury, as well as the five members of the architectural board. Among them, Shreve had the most experience with large projects, having worked on a succession of major Manhattan skyscrapers, most notably, the Empire State Building (Shreve, Lamb & Harmon, 1931). 10 A graduate of the College of Architecture at Cornell University (1902), he began his career as a member of the school's faculty and later joined the firm of Carrére & Hastings in New York City where he distinguished himself as having a "genius for the solution of operational and administrative problems."11 Whereas prior to the Depression he mainly worked on office buildings, in his later years Shreve was associated with residential developments, most notably the Vladeck Houses (1940) on the Lower East Side, and Parkchester (1938-42), a development with more than twelve thousand apartments in the Bronx. During the late 1930s, he also served as a member of the board of design for the New York World's Fair.

# Design

Of the three initial projects built by the NYCHA and the PWA, the Williamsburg Houses were the most innovative. Shreve appointed Lescaze as the chief designer, responsible for the plan and elevations. In the 1930s, he was at the height of his career, profiled in publications read by professionals and the layman. <sup>12</sup> Born near Geneva, Switzerland, in

1896, he studied in Zurich with the architect Karl Moser in 1915-19 and for a brief period worked in Paris with Henri Sauvage, an important designer of apartment buildings. Lescaze moved to the United States in 1920 and after working in Cleveland and New York City, formed a partnership with George Howe, a Philadelphia architect, in 1929. Their association lasted four years and produced one architectural masterpiece, the Philadelphia Savings Fund Society building, completed in 1932. During the mid-1930s, he was extremely active, working on unrealized plans for the Museum of Modern Art, the Brooklyn Museum, and the Brooklyn Children's Museum, as well as building three of the earliest modern-style townhouses in Manhattan, his own house and studio, completed in 1934, as well as the Raymond C. and Mildred Kramer (1934-5) and Edward and Dorothy Norman (1940) houses. 13 He also designed, with Albert Frey, the Chrystie-Forsyth Houses. Planned in 1931, this unrealized proposal was included in the Museum of Modern Art's socalled "International Style" exhibition of 1932.

One of the most unique aspects of the Williamsburg Houses is the plan. To create the 23.3 acre complex, twelve blocks were acquired by the city, and the two east-west streets (Stagg and Ten Eyck) were closed to traffic to create four "super" blocks. All but one extend three full blocks from north to south, except part of the block between Manhattan and Graham Avenues that was set aside for a new junior high school and play area.

The development of New York City was closely tied to its gridiron. Introduced in 1811, it resulted in a city of predictable intersecting streets and avenues. In 1835, a similar plan was approved for Brooklyn and by the early 1850s the streets that cross through the site of the Williamsburg Houses had opened. Most were named for area residents, such as Daniel Maujer, a lawyer and alderman, John and James Lorimer Graham, land jobbers, and James Scholes, a local land owner. The impact of this approach is visible throughout New York City, establishing blocks and lots of equal size and dimensions. Residential developers benefitted immensely, commissioning rowhouse and tenement designs that could be repeated without regard to location.

By the end of the 19<sup>th</sup> century, there was relatively little open space in Manhattan and Brooklyn. As part of the City Beautiful movement, various attempts were made to loosen the grid's hold, first through the passage of the Small Parks Act in 1887, which focused on tenement neighborhoods, and later, by situating major civic structures in plazas. Similar ideas shaped the

development of garden apartments which came into vogue after 1910. One of the primary characteristics of this type of multiple dwelling was reduced site coverage. In most cases, such as in the Jackson Heights Historic District, the buildings were set around the perimeter of each block, enclosing large private gardens, but in other situations, such as at the Harlem River Houses, a "crankshaft" arrangement was adopted, creating a mixture of interior and exterior courts.

Lescaze borrowed freely from both the garden apartment tradition and architects associated with European modernism. In his earliest design, each block incorporated six U-shaped structures arranged around a narrow central court. A later design was considerably more irregular. Turned at an angle to the street, there were fewer but larger buildings. Many aspects of this proposal were integrated into the final design. The Williamsburg Houses are configured in three ways, with footprints suggesting a capital "H," small "h," and "T." All have small spurs and extensions, resembling crossbars. By adding this feature the number of courtyards was significantly increased. Within each block are six buildings (except north of the school); at the north and south are the "H" and "h" configurations, and in the middle, the "T"s.

The decision to turn the buildings at a 15 degree angle to the street grid proved controversial. PWA accounts described it in functional terms, explaining that the orientation would provide tenants with more sun and take advantage of the prevailing northwest breezes. During the previous decade, many architects and planners experimented with similar ideas. One of the earliest built examples "to deviate from the geometry of the New York gridiron" was the Mesa Verde apartments (1926) in Jackson Heights. Designed by Henry Atterbury Smith and based on an earlier proposal from 1917, the development featured two rows of six "closed L buildings" set at 45 degree angle to the surrounding streets.<sup>15</sup>

Lescaze, however, was more likely to have been influenced by European sources. During the 1920s, he frequently returned to Europe, a period when leading architects were involved in the design of social housing. Many favored the "tower in the park" approach in which free-standing high-rise structures stood in continuous open space. Writing in English in 1935, Walter Gropius concluded that apartment blocks should "command a clear view of the sky, over broad expanses of grass and trees which separate the blocks and serve as playgrounds." Another source of inspiration might

have been Ernst May who oversaw the design and construction of many low-rise housing estates in Frankfurt. In his Bruchfeldstrasse development of 1926-27, designed with C. K. Rudloff, one section was arranged in an overlapping zig-zag configuration. As in Williamsburg, each unit had corner windows, providing tenants with uninterrupted views of a central garden.

Many writers were skeptical about the benefits of Lescaze's plan. Hamlin argued that the layout would convert the courts "into perfect channels for our most vicious northwest winds." He was told that the arrangement had, in fact, been chosen for aesthetic reasons, to "break up the street facades" and "allow the feeling of space to weave in and out on the street fronts. 17 This goal was definitely achieved, producing an environment that was new and distinctive. The flowing spaces that Lescaze planned are less monumental and more intimate than those experienced in most housing projects, juxtaposing wedge-shaped lawns with semi-enclosed courtyards and large open plazas. As originally built, no fences interrupted the spaces and the areas adjoining the curving concrete walks were paved with cobblestone.

#### The Elevations

Equally modern were the elevations. Lescaze was attracted to the expressive and aesthetic qualities of modern materials. Particularly unusual was the decision to use a light-colored palette. Built from reinforced concrete, the walls were originally enclosed with a sand-cast brick that was variously described by observers as bright tan, yellowish, pinkish, and grayish warm pink. One of the most notable features was the exposed concrete floor plates which express the structure and division between the floors while giving the complex a strong horizontal appearance. Talbot Hamlin observed:

The effectiveness of the buildings is undoubted. The striping of brick and concrete and the contrast of the light walls which front the stair towers make a vivid picture . . . <sup>18</sup>

Prior to the mid-1930s, red brick was the most frequently used material in housing developments, used throughout Jackson Heights and in the First Houses and Harlem River Houses. The proposal to break with this tradition generated considerable debate. While the general scheme was approved in June 1935, it was not until October that specific materials were selected. Presumably, the PWA

wished to standardize the building process and reduce costs. Frederick Ackerman, technical director of the NYCHA, defended Lescaze's proposal. He wrote the authority's chairman, Langdon W. Post:

... the "effect" of the Project will depend very largely upon the texture and quality of the exterior wall. Unless the exterior wall possesses a greater intrinsic interest than one made of common brick then the resultant effect is certain to be a bleak, barren and unusually forbidding mass of building: One might readily mistake the Project for a group of factories. 19

At Williamsburg, the buildings stand as freestanding objects, finished on all sides and approachable from multiple directions. No facade dominates and the apartment entrances face both the streets and courtyards. For those unfamiliar with the layout, the angled plan may have been somewhat disorienting. To make it easier to navigate, signs were installed throughout the complex and Lescaze skillfully designed the entrances, making dramatic use of color and form. Like Le Corbusier, he was an "accomplished" painter and frequently used color, especially blue, to enliven wall surfaces.<sup>20</sup> Another possible model was May's housing development at Praunheim (1926-29) where contrasting colors were used to give the projecting stair towers a distinctive appearance.21

Within the courtyards are as many as five entrances. Each is sheltered by a small cantilevered aluminum marquee and is flanked by square blue terra-cotta tiles. The entrances that are located at the far end of the larger courtyards are set at a angle. In these instances, the tiles spread onto the adjoining walls and extend above the parapet to the stair bulkhead. Other tile treatments project slightly forward, or are recessed above the doors to the roof. An entrance is also located in the covered breezeway. Reached by a short flight of stairs connecting both the street and courtyard, the more public street facade had an asymmetrical character, incorporating projecting blue tiles to one side and a wide aluminum marquee.

# Construction

To prepare the site for construction, 568 buildings were demolished on 349 lots and approximately 5,400 people were relocated. A 1935 report described the population as divided equally between American born, Italian born, and other nationalities. Most were semi-skilled workers, employed in manufacturing, or as clerks, truck

drivers, and construction workers.

Demolition commenced in June 1935 as PWA supervisor Elizabeth Ross dug a crowbar into the facade of 197 Manhattan Avenue, near Ten Eyck Street. In the months that followed:

Steam shovels and picks played a tune to rival that of the pipes of the Pied Piper of Hamlin. From every dank basement and crumbling wall rats fled in droves.

Backyards disgorged an assortment of rusted cans, trash, filth and litter that would have discouraged the most voracious goat.<sup>22</sup>

Ground was broken on January 3, 1936. Following a brief ceremony in the rain, public officials addressed an audience of five hundred at Public School 196. During April 1936, the first foundations were poured at the southwest corner of Manhattan Avenue and Stagg Street. Mayor Fiorello H. LaGuardia was in attendance, followed by "a few hundred interested onlookers and an army of schoolboys."

As the foundations neared completion, the PWA solicited bids for construction. Starrett Brothers & Eken was awarded the \$7.5 million contract for the first 18 buildings in October 1936. A subsequent contract, for construction of buildings No. 5 and 18, was signed in late April 1937.<sup>23</sup> Founded by Paul Starrett (1866-1957) and William Aiken Starrett (1877-1932) and Andrew J. Eken (1882-1965) in 1922, the firm was responsible for such high-profile buildings as the New York Life Insurance Company Building (1925), Bank of Manhattan Building (1929-30), McGraw-Hill Building (1930-31), and Empire State Building (1930-31, all are designated New York City Landmarks). The Starrett Brothers worked closely with Shreve on the Empire State Building and it is likely that this relationship helped secure the contract for the Williamsburg Houses. William Starrett acknowledged the importance and complexity of this issue when he said:

It is the hope of people who are discussing this (slum) problem that those same brains that put together the great skyscrapers . . . will turn toward this.<sup>24</sup>

Starrett Brothers & Eken later built Parkchester (Richmond H. Shreve, chairman of the board of design, 1938-42), Stuyvesant Town (Irwin Clavan and Gilmore Clarke, 1943-49) and Peter Cooper Village (Irwin Clavan and Gilmore D. Clarke, 1947) for the Metropolitan Life Insurance Company.

The cornerstone was laid in October 1936. It contained an aerial view of the site, a copy of the

federal act creating the PWA, as well as an autographed copy of Jacob Riis's timeless account of slum conditions, *How the Other Half Lives*, donated by his widow. Construction progressed rapidly, and aside from minor walk-outs by metalworkers and painters, the first six buildings were ready for occupancy with a year, in September 1937.<sup>25</sup>

# Publicity

The Williamsburg Houses was the largest and costliest project built by the PWA. With 1,622 apartments, it was more than twice the size of the Harlem River Houses. The approximate cost was \$12.8 million. It was described by the PWA as part of "demonstration program" and numerous public events were held. In a letter to Post, Shreve stated:

As this project is the beginning of what, in a way, is a housing community experiment and as the public attitude toward housing will be largely controlled by the success or failure of such an experiment, it is of importance that every effort be made to make the first experiment successful.<sup>26</sup>

In this context, how the project was perceived was of the utmost importance. Once the design had been approved, a scale model was built by the PWA and exhibited at banks in Brooklyn Heights and Williamsburg during late 1935 and 1936. This presentation was accompanied by a series of posters documenting the site, including photographs of earlier buildings and their demolition, as well as projected floor plans. The *New York Times* reported the model:

... throws into graphic relief the application of the new principle of multiple housing, providing more air, sunlight and recreational facilities and involving a departure from the solid-block construction.<sup>27</sup>

The idea of using public funds to create low-income housing was relatively new and much of the language used in speeches and press releases heralded it as a major advance. At the site, signs were posted, calling Williamsburg the "Largest Low Rental Development in the USA." At the ground-breaking, public officials evoked the memory of Alfred T. White, whose Brooklyn developments were among the first attempts to improve low-income housing in the nation. Mayor LaGuardia thanked the President, Franklin Delano Roosevelt, for his support, as did Harold L. Ickes, Secretary of

the Interior, who described slums as a "vicious project of that old order whose passing, we hope, is at hand." While some critics equated the federal housing program with socialism, most speakers saw it as a defense of democracy.<sup>28</sup>

In November 1935, Post had contacted the PWA, requesting that the complex be called the "Ten Eyck" Houses. No explanation was given, but it is likely that the request was made to distinguish the new development from the larger surrounding neighborhood. Ten Eyck Street was one of two eastwest streets closed to create the site and it was probably named for the Dutch family whose Brooklyn lineage extended back to at least the 18th century. In the immediate area also lived William Ten Eyck, who during the mid-19th century served as the deacon of the Reformed Church of South Bushwick (1853, a designated New York City Landmark). Post's request was quickly approved. The new name, however, was not widely used and a 1938 PWA publication refers to the development as the Williamsburg Houses.<sup>29</sup>

On October 28, 1936, the construction site was briefly visited by President Franklin Delano Roosevelt and Eleanor Roosevelt. According to the *New York Times*, ten thousand school children and five thousand adults "cheered the President's passage through the streets bordering the housing project." <sup>30</sup>

Three "model" apartments were opened for public view in July through August 1937. Furnished with loans from various Brooklyn department stores, they were presented at 180 Maujer Street. Post was an early visitor and he described the apartments as a "demonstration of what can be done, this is the most valuable contribution to social progress that the New Deal has made." An average of 1,200 persons a day visited. In September 1937, a second group of apartments opened at 176 Maujer Street, including one decorated entirely with "reconditioned furniture." In a related development, during April and May 1938, the WPA created an exhibit in a storefront office at 212 Graham Avenue. Organized by William Friedman of the art teaching division, the display was changed periodically to demonstrate different apartment layouts and decoration. Nine experts spent five months preparing the exhibit, hoping that it would influence local residents and provide a model for future public housing developments.<sup>31</sup> A music branch, at 176 Maujer Street, also provided lessons in theory, voice, and various instruments.32

#### **Tenants**

According to the *Brooklyn Eagle*, the Williamsburg Houses were "one of the most perfect home sites in the word . . . an eagerly sought spot to live." Income and need formed the basis of selection and no tenant could earn more than five times the annual rent. Preference was also given to former residents of the site.

The first tenants began to occupy their apartments on September 30, 1937. The New York Times devoted at least two articles to "Moving Day," as did the *Brooklyn Eagle*. As part of the operation, each tenant's belongings were moved to a fumigation plant for sterilization near the intersection of Bushwick Avenue at Scholes Street. This procedure was described as a "wise precaution against the spread of disease."34 Bessie and Louis Grabkowitz were recognized by the NYCHA as the first official tenants. A week's rent, of less than seven dollars, was paid and they were given keys to their new apartment. Two to five rooms in size, units featured steam heat, hot and cold water, as well as electric stoves and refrigerators. Residents praised their new homes, commenting on the appliances and abundant sunlight.

By the end of 1937, most apartments were occupied. A community newspaper, the *Projector*, began publishing on a semi-monthly basis in December 1937. In April 1938, the complex was completed. In addition to the twenty residential buildings, there were retail spaces, facing the north-south streets. The PWA reported:

To insure efficient, sanitary commercial services, 49 stores and shops within the project, distributing drugs, groceries, appliances, and general merchandise, have been leased to private individuals.<sup>35</sup>

The storefronts were executed in a sleek Moderne style. To the north and south, they curved away from the street, recalling the streamlined designs of Erich Mendelsohn, as well as J. J. P. Oud's Kiefhoek development of 1925. The prominent metal parapets were blue, matching the color of the apartment entrances. Despite their polished design, a significant number failed to attract and retain tenants. Consequently, in 1945 ten unleased spaces, near the corners of Maujer and Leonard Streets, and Scholes Street and Bushwick Avenue, were converted to apartments.<sup>36</sup>

Tenants enjoyed a variety of useful services. At the center of the complex, on Graham Avenue stood the stripped classical-style William J. Gaynor Junior High School (1936-37), and opposite it, Building No. 11 housed a nursery school. Incorporated into the building's south court and featuring a large play terrace, Hamlin described its glass-fronted design as "pleasant" and "delightful." In addition, a new Moderne-style health center was built directly across from the complex, on Maujer Street.

Throughout the development were "social and craft rooms." These basement spaces were originally used for classes, clubs, and meetings and many were decorated with large colorful murals. In contrast to the majority of WPA murals that were executed in style of social realism, the Williamsburg murals were non-objective. Lescaze favored "abstract and stimulating patterns" and Burgoyne Diller who headed the Federal Art Project, wrote that:

The decision to place abstract murals in these rooms [of the Williamsburg Housing Project] was made because the areas were intended to provide a place of relaxation and entertainment . . . The more arbitrary the color, possible when not determined by the description of objects, enables the artist to place an emphasis on its psychological potential to stimulate relaxation.<sup>38</sup>

Of twelve murals commissioned, at least five were installed. In the early 1990s, the deteriorated canvases were restored and moved to the Brooklyn Museum of Art. They include works by the American painters Ilya Bolotowsky, Paul Kelpe, and Balcomb Greene.

# Critical Reception

The opening of the Williamsburg Houses was treated as major news and writers used the event to analyze the project and express their own views about the role of public housing and the importance of modern architecture. Some of the earliest comments came from the architect Walter Gropius, former director of the Bauhaus in Germany. On a visit to New York City in April 1937 he was interviewed by H.I. Brock in the *New York Times*. They traveled together throughout the city, visiting both new skyscrapers and the nearly-complete Brooklyn development. Gropius was impressed and praised the unusual plan, saying that Lescaze:

... seems to have solved the problem of space and light very successfully and economically, and it has the great advantage of being spread over enough land to make it worthwhile as a sample of planned development.<sup>39</sup>

Lewis Mumford was the first critic to publish a substantial review in February 1938. As a persistent advocate for public housing, he used the opportunity to evaluate the "outlines of the new order of building." He praised the PWA for eschewing "overpriced building lots" and instead assembling large sites in quieter areas where streets could be closed to traffic to create gardens and playgrounds. Considerable attention was paid to the slanted orientation. Although he described it as "a bit queer," he liked the way it separated the residences from the street and that it gave the appearance that the architects were concerned about providing tenants with ample sunlight. 40

Talbot Hamlin published the most-detailed analysis. In this review, he addressed both PWA projects, calling them "a new vision of democracy ... they are better than the most expensive apartments on Park Avenue." Despite such praise, he expressed mixed feelings. While he found the buildings "fresh and inventive and alive," he was disturbed by the "shockingly low" standards of construction. He also admired the "imaginative and carefully studied detailing," but criticized the landscaping as little more than adequate. *The WPA Guide to New York City*, published in 1939, shared similar views, quoting Hamlin's review, and praising the design of the individual buildings. 41

In the years since completion, the Williamsburg Houses have been a frequent subject for architectural historians. Many, starting with the Museum of Modern Art in 1939, have placed the development within the context of European modernism. In an exhibition celebrating the museum's 10th anniversary and the opening of its new building, it was the only architectural work represented that was located in New York City. In a brief essay on housing, the curators highlighted the "triple-size superblocks," that form an "oasis of open space," but criticized the adjoining school building as a lost opportunity to create a "truly important work."42 Photographs of the complex were also included in Forms and Functions of Twentieth-Century Architecture (1952), in sections devoted to city planning and concrete construction. G. Holmes Perkins wrote in the city planning section that despite faults, the complex "may be held up as patterns for tomorrow." Richard Pommer, in one of the most insightful discussions of Depression-era housing in the United States, criticized the angled plan, calling Lescaze a "versatile pasticheur" who used visual effects without logic or relation to function. Robert A. M. Stern shared this view, writing in 1980 that it "seems overrated."44 Richard

Plunz, in *A History of Housing in New York City*, credited the project as the start of a "brief but intense struggle" to determine the aesthetic direction government-built housing would take. <sup>45</sup> All four editions of the *AIA Guide to New York City* have praised the Williamsburg Houses. The 1968 edition called it a "**very successful solution** to the problem of low-rent subsidized housing," and in 2000 "the best public housing project ever built in New York."

# Subsequent History

Conveyed by the federal government to the NYCHA in 1957, the Williamsburg Houses continue to serve their original purpose, housing more than three thousand New Yorkers. <sup>47</sup> Major alterations were first proposed in 1980 and significant work took place during 1985-91. At this time, the original casement windows were replaced with bronze-colored aluminum sash and the blue terra cotta that surrounded the entrances, with tan "Morocco" glazed brick.

In a remarkable turnaround, during the mid-1990s, the facades were restored.<sup>48</sup> What began as continued maintenance, soon evolved into a major architectural project, requiring an outside contractor and consultation with the Landmarks Preservation Commission. Under the supervision of Neil Cohen of the NYCHA, the elevations were completely reskinned, the parapets replaced, as well as the chimneys, railings, and terra-cotta banding. In addition, new canopies, doors, lighting fixtures, and signage were fabricated. The approximately \$70 million project was executed with great sensitivity; there was an article in the real estate section of the New York Times and the NYCHA was the recipient of the Lucy G. Moses Preservation Award from the New York Landmarks Conservancy (1999), which praised the participants for restoring the complex to "better-than-new condition." Restoration of the storefronts, except along Bushwick Avenue, was completed in 2002.

The high standards set by the design of the Williamsburg Houses have rarely been matched. Innovative in terms of scale, plan, and aesthetics, it remains one of the most pleasant and architecturally-distinguished housing developments in New York City.

# Description

There are twenty walk-up buildings in the 23.3-acre Williamsburg complex and a total of 1,620 apartments. These buildings are numbered from 1 to 20 and each entrance has its own street address, for

instance, "112 Maujer Street." Stainless steel signs, with pin-mounted numbers and letters, identify each entrance. The site extends four blocks east to west, from Bushwick Avenue to Leonard Street, and three blocks north to south, from Maujer to Scholes Streets. The principal north-south artery is Graham Avenue. Between Maujer and Scholes Streets, Ten Eyck Street and Stagg Street are closed to vehicles. These winding east-west paths are called Ten Eyck Walk and Stagg Walk. They are identified by large pin-mounted stainless steel letters attached to the building facades and are visible along the northsouth streets. Throughout the complex are wallmounted cantilevered lighting fixtures. These glass and aluminum fixtures are reproductions of the originals.

Three of the four blocks have a tree-shaded open space at center. At present, non-historic benches, play equipment, and basketball courts are located here. Most lawns are enclosed by low iron fences. Though not original, these fences pre-date the 1990s. Pole-mounted lighting fixtures are occasionally used to illuminate these areas.

All buildings materials are non-historic. Each structure is four stories tall and clad in ochre-colored brick. Exterior concrete spandrel beams are exposed at each floor. To disguise patches to the concrete, the beams are coated with a grey-colored water repellency finish. The entrances are flanked by blue structural glazed facing tiles that are approximately 12 by 12 inches. Blue mortar was used to minimize the joint lines. A canopy projects in front of each entrance (except on one side of the breezeways). Made of stainless steel, they incorporate recessed down lights. Some canopies are supported by a single pipe column. The entrance doors and sidelights are made of stainless steel. Each door has a grid of four small square windows. Breezeways serve a dual purpose: reached by two sets of stairs, they provide an additional north-south passage, as well as entry to apartments. Most of the stairs are flanked by stainless steel railings. The bronze anodized aluminum windows, installed in the 1980s, are all one-over-one. Arranged as single windows or in pairs, they have concrete sills and meet the concrete spandrels above. The smaller windows light the bathrooms. Single windows and pairs are located where the facades meet, often creating triple-width openings at the cantilevered corners.

There are three general building configurations. All are original to the complex. They include eight buildings with "H" shaped floor plans, six with floor plans that suggest a small letter "h," and six buildings with "T" shaped floor plans. While the

"H" and "h" types alternate along Maujer and Scholes Streets (except next to the school where both are "H" shaped), the "T" shaped buildings are located only between Ten Eyck Walk and Stagg Walk.

The "H" buildings (Nos. 1, 6, 7, 8, 9, 14, 15, and 20) are nearly symmetrical, with almost identical north and south courtyards. At the center of each court is either a projecting center section or breezeway. The apartments are reached by four distinct entrances, each with a different tile treatment. They include: corner, wide, recessed between the door and the roof, and incorporated within a breezeway. Each entrance leads to interior stairs. The windows that light the stairs are arranged in horizontal grids of six and eight panes. Except for the recessed variant, the tiles project slightly and rise above the parapet to the stair bulkhead. The opposite side of the breezeway has no tilework. Reached by stairs, each breezeway incorporates two concrete columns and a metal door. The "h" buildings (Nos. 2, 5, 19, 13, 16 and 19) are similar to the "H" buildings, except one court is partially enclosed.

The "T" buildings (Nos. 3, 4, 11, 12, 17, 18) have shallow courts. The top of the 'T" has three entrances, each framed with blue tiles. A pair of entrances are also found facing each other in one of the side courts, and occasionally on the opposite side, as well. Building No. 11, located on the east side of Graham Avenue, is unique due to the presence of a nursery school at the wider south end. To accommodate this function, the entrances were moved and the court at the south end was enclosed. The south wall of school is clad with glass blocks, many of which are original. A concrete shed, at the center of the wall, is not historic and there are plans

for removal. From the south facade extends a raised play area that is enclosed by a fence. Along the east side of the building, facing Graham Avenue, a non-historic ramp with metal railings has been constructed.

Commercial storefronts parallel the streets and adjoin the apartment buildings in various locations. The materials are non-historic, but the new elevations closely resemble the originals. The largest storefronts are located on either side of Graham Avenue, between Maujer Street and Ten Eyck Walk (Nos. 8 and 9). Smaller retail spaces are located along Graham Avenue (near Scholes Street, No. 13); on Leonard Street (near Maujer Street, No. 1); and on Bushwick Avenue (between Maujer and Stagg Walk, No. 16). They have a stream-lined character and curve away from the street at both ends. One story tall, they have granite bases and are clad with stainless steel and metal that has a baked-on blue porcelain finish. Above the storefronts runs the blue metal parapet, crowned by a stainless steel roof rail. Lighting was added above the storefronts, and security gates, when the stores are open, roll up and are neatly hidden within the facades. Large glass blocks or plate glass are used throughout. Along Bushwick Avenue, the modifications are less sympathetic and a vertical grid of older decorative concrete block occasionally interrupts the facade.

Researched and written by Matthew A. Postal Research Department

# **NOTES**

- 1. This section is based on Richard Plunz, *A History of Housing in New York City* (Columbia University Press, 1990) and Gwendolyn Wright, *Building the Dream: A Social History of Housing in America* (The MIT Press, 1981).
- 2. The Home and Tower Buildings are located in the Cobble Hill Historic District. Riverside, which was partially demolished during construction of the Brooklyn-Queens Expressway, is located in the Brooklyn Heights Historic District. The Astral Apartments is a designated New York City Landmark.
- 3. LPC, First Houses Designation Report (LP-0876) (New York, 1974).
- 4. LPC, *Harlem River Houses Designation* Report (LP-894) (New York, 1975). Completed in 1937, Archibald Manning Brown was the chief architect and Horace Ginsbern was the lead designer.
- 5. Clipping, "Most Densely Populated Block is Located in Williamsburg," *Brooklyn Eagle*, January 25, 1920.

- 6. Williamsburg Houses: A Case History of Housing (PWA: Washington, DC, 1937), 12.
- 7. Ibid., 10.
- 8. Two architects who worked on the Williamsburg Houses served on the jury: Lescaze and Del Gaudio. It should be noted that no architect could work on more than one PWA project. See "Architects Picked for PWA Housing," *New York Times*, July 25, 1934.
- 9. Little is known about these architects. Gardstein designed Phelp's Place (1928) on Staten Island. Gurney worked with Warren & Wetmore and later became the chief architect of the New York Life Insurance Company. See "Manhattan House Called Outstanding," *New York Times*, May 14, 1952. Walker designed the Atlanta Athletic Club (1908) and the Bronxville Public Library (1942). Consultants for the project's Landscape Architecture and Engineering included Vitale & Geiffert; Gilmore D. Clarke; Meyer, Strong & Jones; Fred Brutschy and George E. Strehen. Irwin Clavan, of Gurney & Clavan, served as the office manager.
- 10. The Empire State Building is a designated New York City Landmark.
- 11. New York Times, September 11, 1946.
- 12. For information on Lescaze's career, see *New Yorker* (December 12, 1936), 44; Obituary, *New York Times*, April 10, 1969; Lorraine Welling Lahmon, *William Lescaze*, *Architect* (Philadelphia, 1987).
- 13. The Lescaze house and studio is a designated New York City Landmark. The Kramer House (32 East 74<sup>th</sup> Street) and the Norman House (124 East 70<sup>th</sup> Street) are located in the Upper East Side Historic District.
- 14. See street files, Brooklyn Collection, Central Library, Brooklyn Public Library. Manhattan Avenue was originally called Ewen Avenue, named for Daniel Ewen, the city surveyor who mapped Williamsburg. It was renamed in 1897.
- 15. See Plunz, 174, 176-79.
- 16. Walter Gropius, The New Architecture and the Bauhaus (Great Britain, 1935), 102.
- 17. Ibid., 286.
- 18. Talbot F. Hamlin, "Harlem River homes and Williamsburg houses, *Pencil Points* (May 1938), 287.
- 19. F.L. Ackerman, memo to Langdon W. Post, "Williamsburg, A Comment Preliminary Submissions of Elevations, August 21, 1935, NYCHA Collection, LaGuardia and Wagner Archives.
- 20. New Yorker (December 12, 1936), 44.
- 21. In designing the kitchens for one of May's Frankfurt developments, M. Grete Schutte-Lihotsky used blue cabinet fronts to repel flies. See Susan R. Henderson, "A Revolution in the Women Sphere: Grete Lihotsky and the Frankfurt Kitchen" in *Architecture and Feminism* (New York: Princeton Architectural Press, 1996).
- 22. Williamsburg Houses, 20.
- 23. "PWA Accepts New Bid," New York Times, April 30, 1937. These buildings (151 units) were held up by the "clearance of title."
- 24. "American Modern: Seven Housing Projects," Perspecta 30 (1999), 32.
- 25. Brooklyn Eagle, July 31, 1937; September 3, 1937.
- Richmond H. Shreve, letter to Langdon W. Post, July 31, 1935, NYCHA Collection, LaGuardia and Wagner Archives.
- 27. "Housing Project Shown in a Model," *New York Times*, December 19, 1935. It is likely that the model was also exhibited at a NYCHA exhibition at Madison Square Garden in May 1937.
- 28. "12,500,000 Housing Begun in Brooklyn By Ickes and Mayor," New York Times, January 4, 1936.

- 29. A.R. Clas, letter to Langdon Post, November 8, 1935 and November 20, 1935. NYCHA Collection, LaGuardia and Wagner Archives.
- 30. New York Times, October 29, 1936, 20. During his visit he laid the cornerstone of the gym at Brooklyn College.
- 31. "Model PWA Homes Opened to Public," *New York Times*, July 7, 1937; "Model Flats on View," *New York Times*, September 11, 1937; "WPA Artists to Aid Housing Tenants," *New York Times*, April 6, 1938.
- 32. "New WPA Music Branch," New York Times, May 20, 1940.
- 33. Brooklyn Eagle, August 25, 1937.
- 34. Brooklyn Eagle, September 30, 1937.
- 35. Williamsburg Houses, 25.
- 36. "Williamsburg Houses Started," *New York Times*, September 2, 1945. It should be pointed out that in subsequent years, commercial storefronts were banned in most public housing complexes. See "Shopping Scarce in City Projects," *New York Times*, June 16, 1957.
- 37. William Lescaze, letter to Langdon W. Post, November 2, 1936. NYCHA Collection, LaGuardia and Wagner Archives.
- 38. Burgoyne Diller, "Abstract Murals," <a href="http://newdeal.feri.org/art/art02.htm">http://newdeal.feri.org/art/art02.htm</a>. The Bolotowsky mural was approved for Building 4 on June 27, 1937, NYCHA Collection, LaGuardia and Wagner Archives.
- 39. "A Modernist Scans Our Skyline," New York Times, April 11, 1937.
- 40. "The Skyline: The New Order," *New Yorker* (February 26, 1938), reprinted in *Sidewalk Critic* (New York: Princeton Architectural Press, 1998), 209-12.
- 41. Hamlin, see p. 286-90; WPA Guide to New York City, 1939, see: www.brooklyn.net/neighborhoods/williamsburg.html
- 42. Art In Our Time (New York: Museum of Modern Art, 1939), 315, 324. Four urban PWA projects were included. The other examples illustrated in the catalogue include the Cedar Central Apartments (Cleveland, 1937), Trumball Park Homes (Chicago, 1937) and Lakeview Terrace (Cleveland, 1937).
- 43. Form and Functions of Twentieth-Century Architecture, edited by Talbot Hamlin (New York: Columbia University, 1952), see "Framed Construction: Steel and Concrete," vol. 2, 445; "The Architect and City Planning," vol. 4, 835.
- 44. Richard Pommer, "Architecture of Urban Housing in the United States during the Early 1930s," *Journal of the Society of Architectural Historians* (December 1978), 251; Robert A. M. Stern, "With Rhetoric: The New York Apartment House, *VIA IV: Culture and the Social Vision* (University of Pennsylvania, 1980), 100. The complex is also discussed in Peter G. Rowe, *Modernity and Housing* (The MIT Press, 1993).
- 45. Plunz, 219.
- 46. Norval White and Elliot Willensky, *AIA Guide to New York City* (New York: The Macmillan Company, 1968), 323; (New York: Three Rivers Press, 2000, 4<sup>th</sup> edition), 758.
- 47. "U.S. Gives Projects to City Housing Unit," *New York Times*, June 11, 1957. The other development was the Harlem River Houses.
- 48. Joseph T. Koelbel, "The Other Williamsburg," Building Renovation (Spring 1995), 36-41.
- 49. Christopher Gray, "A \$35 Million Fix For a 1983 Complex," New York Times, May 9, 1993.

#### FINDINGS AND DESIGNATION

On the basis of the a careful consideration of the history, the architecture, and other features of these buildings, the Landmarks Preservation Commission finds that the Williamsburg Houses have a special character and a special historical and aesthetic interest and value as part of the development, heritage, and cultural characteristics of New York City.

The Commission further finds that, among their important qualities, the Williamsburg Houses are notable as one of the earliest public housing developments in the United States to reflect the influence of the modern movement in architecture; that it was built by the Federal Public Works Administration and the recently-established New York City Housing Authority; that it was designed by the Williamsburg Associated Architects during 1935 and that most apartments were occupied by early 1938; that among the ten architects who contributed to the design, the best known were Richmond H. Shreve, of Shreve, Lamb & Harmon, architects of the Empire State Building, and William Lescaze, the Swiss-born architect who helped introduce the so-called "International" Style on the east coast of the United States; that the development has an unusual layout, with all twenty buildings turned at a 15 degree angle to the street grid; that the buildings cover slightly more than thirty percent of the 23. 3 acre site; that the elevations display a light-colored palette, distinguished by tan brick and exposed concrete floorplates; that the various entrances are marked by blue tiles and stainless steel canopies; and that during the 1990s the buildings underwent a sensitive and award-wining restoration program sponsored by the Housing Authority and the Landmarks Preservation Commission.

Accordingly, pursuant to the provisions of Chapter 74, Section 3020 of the Charter of the City of New York and Chapter 3 of Title 25 of the Administrative Code of the City of New York, the Landmarks Preservation Commission designates as a Landmark the Williamsburg Houses, 142-190 Leonard Street, 163-213 Manhattan Avenue, 202-254 Graham Avenue, 215-274 Humboldt Street, 122-192 Bushwick Avenue, 83-221 Scholes Street, 86-226 Maujer Street, 88-215 Stagg Walk and 88-202 Ten Eyck Walk, Borough of Brooklyn, and designates Brooklyn Tax Map Block 3025, Lot 46; Block 3026, Lot 1; Block 3027, Lot 1, as its Landmark Site.



Williamsburg Houses
Intersection of Humbolt Street and Scholes Street, looking north



Williamsburg Houses
Ten Eyck Walk, looking east
Photos by Carl Forster



Williamsburg Houses
Leonard Street, at Scholes Street (Building No. 5)



Williamsburg Houses Leonard Street, at Maujer Street (Building No. 1) Photos by Carl Forster



**Williamsburg Houses** Maujer Street, near Manhattan Avenue (Building No. 2)



Williamsburg Houses
Scholes Street, near Humbolt Street (Building No. 19)
Photos by Carl Forster



**Williamsburg Houses** Ten Eyck Walk, North facade of Building No. 4



Williamsburg Houses
Maujer Street, near Manhattan Avenue (Building No. 2)
Photos by Carl Forster



Williamsburg Houses
Nursery school and play area
South facade of Building No. 11, between Stagg and Ten Eyck Walk



Williamsburg Houses
East facade of Building No. 11
Photos by Carl Forster



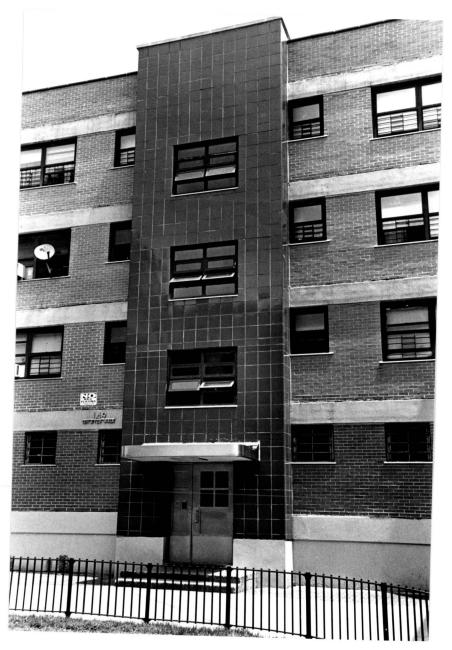
**Williamsburg Houses**Interior court: Ten Eyck Walk, near Graham Avenue (Building No. 8)



Interior court: Ten Eyck Walk, near Leonard Street (Building No. 1)
Photos by Carl Forster



Williamsburg Houses
Entrance to 111 Ten Eyck Walk (Building No. 2)
Photo by Carl Forster



Williamsburg Houses
Entrance to 149 Ten Eyck Walk (Building No. 8)
Photo by Carl Forster



Williamsburg Houses
Entrance to 169 Stagg Walk, at Graham Avenue (Building No. 11)
Photo by Carl Forster



Williamsburg Houses
Entrance to 113 Ten Eyck Walk (Building No. 2)
Photo by Carl Forster



Williamsburg Houses
Storefront at Maujer Street and Graham Avenue, part of Building No. 8



Williamsburg Houses

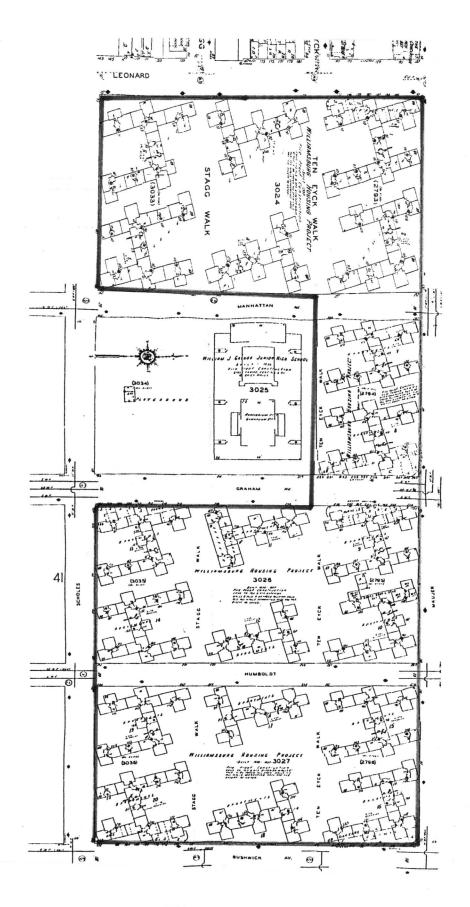
Breezeway entrance at 112 Maujer Street, near Graham Avenue (Building No. 2)
Photos by Carl Forster



Williamsburg Houses Storefront at Bushwick Avenue and Stagg Walk



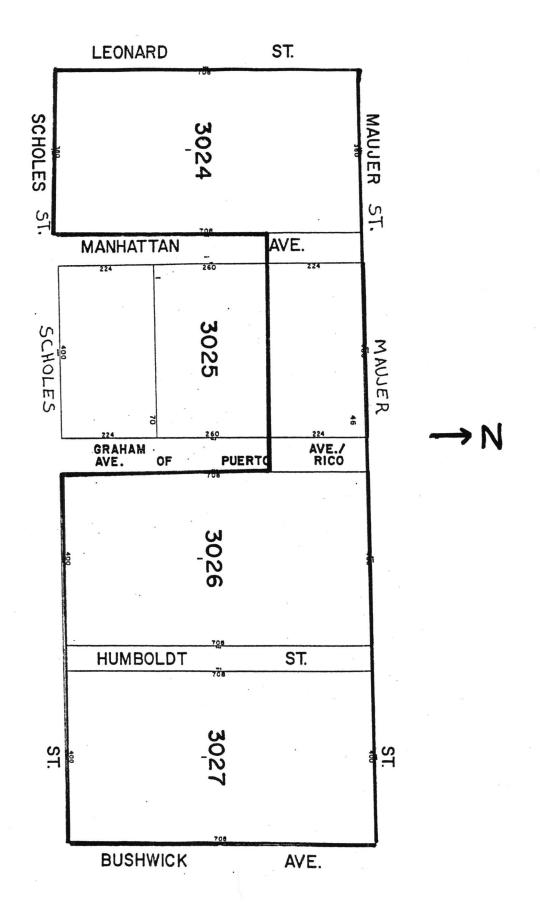
Williamsburg Houses
Storefront at Scholes Street and Graham Avenue
Photos by Carl Forster



# Williamsburg Houses

Landmark Site: Borough of Brooklyn

Tax Map 3024, Lot 1; 3025, Lot 46; Block 3026, Lot 1; Block 3027, Lot 1. Source: Sandborn Building and Property Atlas of Brooklyn, New York, 20th edition, 1999. Vol. 3, plates 38, 42.

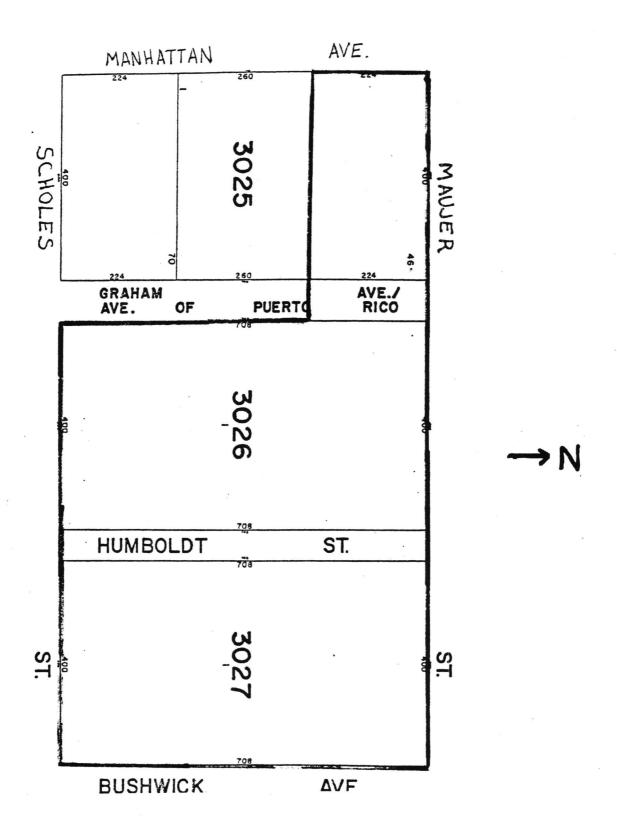


Williamsburg Houses

Landmark Site: Borough of Brooklyn

Tax Map 3024, Lot 1; 3025, Lot 46; Block 3026, Lot 1; Block 3027, Lot 1.

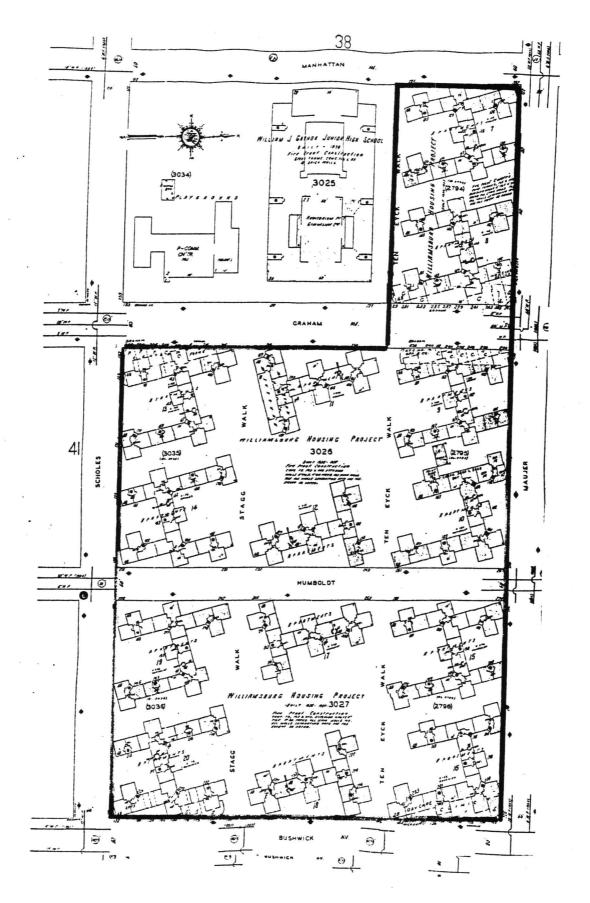
Source: New York City Department of Finance, City Surveyor, Tax Map



# Williamsburg Houses

Landmark Site: Borough of Brooklyn

Tax Map 3025, Lot 46; Block 3026, Lot 1; Block 3027, Lot 1. Source: New York City Department of Finance, City Surveyor, Tax Map



# Williamsburg Houses

Landmark Site: Borough of Brooklyn

Tax Map 3025, Lot 46; Block 3026, Lot 1; Block 3027, Lot 1. Source: Sandborn Building and Property Atlas of Brooklyn, New York, 20th edition, 1999. Vol. 3, plates 38, 42.