

Exhaust and territorialisation at the Washington Bridge Apartments, New York City, 1963–1973

David Gissen

Department of Architecture, The California College of the Arts, San Francisco, CA 94107, USA

Introduction

Completed in 1963, the Washington Bridge Apartments are part of the Washington Bridge Extension Complex sited above the Trans-Manhattan Expressway in the Washington Heights neighbourhood of upper Manhattan (Fig. 1). The extension complex spans the expressway and includes the Washington Bridge Apartments, the Pier Luigi Nervi-designed Port Authority Washington Bridge Bus Terminal, and a parking structure that services the buildings. The following essay examines the centrepiece of the Washington Bridge Extension Complex, the Washington Bridge Apartment development, one of the first highway 'air-rights developments' in the United States — a form of building in which structures span the open space above highways. The Washington Bridge Apartments provided an economic and environmental strategy that enabled municipal, state and developer agents to use financial arrangements and advanced engineering potentially to rectify the pollution problems that highway construction presented to the city, while encouraging the transformation of Washington Heights from a working-class to a middle-class neighbourhood. In the earliest studies for the extension complex, the proposed apartment buildings were located in the air-rights space above the highway, and the proposed apartments were for middle-class residents, a stark contrast to the historically working-class population of the immediate area. While state-subsidised, the influx of middle-class residents to the neighbourhood and the future promise of the taxes levied against the

buildings themselves, made this type of development attractive to the municipal and state governments.

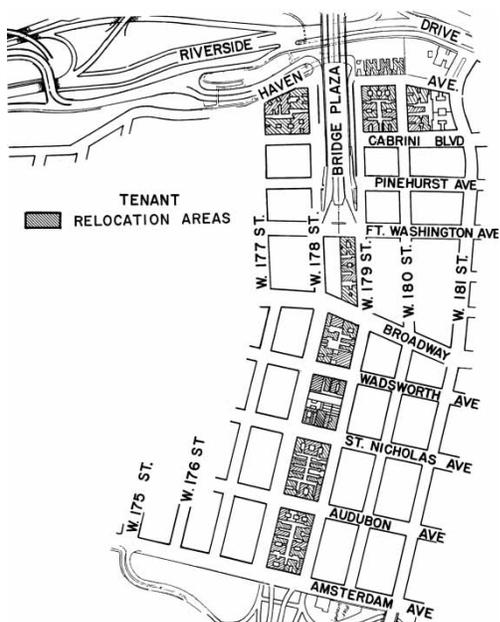
The key impediment to the realisation of highway air-rights development in Washington Heights (or any locale, for that matter) remained the intolerable levels of pollution above urban highways. By the early 1960s highways were central in debates regarding the environmental impact of automobility on cities. The planners, engineers and architects of this and other air-rights developments promised to rectify the problems of invidious automobile pollution at least within the context of the air-rights development itself. The complex's thin, air-circulating slabs, soot-repelling aluminium exterior, and proposed exhaust-removing ventilation system relate to its hostile surroundings in ways that appear to acknowledge the realities of its environment, while making habitation possible. In hindsight, such proposals seem at once optimistic and irresponsible. The resulting intersection of the demographics of air rights — their use to shore up shrinking tax bases and the environmental enclave character of the buildings — produced a new image of urban gentrification: one in which the transformation of a neighbourhood was enacted by simultaneously introducing pollution, dirt and grime via the highway and providing an enclave from that pollution through the apartment building's engineering.

Highways, air-rights and pollution

In postwar New York City, highways provided convenient routes in and out of the city centre,

Figure 1. The Washington Bridge Apartments over the Trans-Manhattan Expressway shortly after completion. (Image courtesy Corbis.)





thereby encouraging expansive urbanisation. However, the construction of highways demolished sections of the city that were formerly tax-generating areas. Highways were generators of one form of capital — through bond issues, tolls and construction contracts — but their construction destroyed existing property tax-generating revenue for the City and State governments. The proposed Trans-Manhattan Expressway sitting beneath the Washington Bridge extension complex would require the demolition of 76 buildings housing 8000 individuals within 1818 families (Fig. 2). The acquisition of the property cost the port authority

approximately \$10,000,000 with a loss of significant taxes for the city. In the earliest discussions of the highway project, the air-rights solution appeared as a viable strategy to recuperate some of these tax losses and the costs of re-housing the displaced residents, and provisions of approximately \$400,000 were implemented in the earliest stages of construction for the future development of an air-rights scheme.¹

The earliest designs for the highway development incorporate various structures above the highway from the Pier Luigi Nervi-designed bus station to a proposed air-rights apartment development by the Lefrak organisation. The bus station's transit links would provide the Port Authority with fees and taxes levied against carriers, and the apartment complex would return taxes to both the City and the State. The securing of the future air-rights development in New York City came with the 1961 amendment to the US Federal Aid Highway Act.² The new amendment contained provisions for the conveying of property over highways to private interests for property development within moderate guidelines. As the Federal government shifted to encouraging air-rights development over highways, a large sub-literature emerged between 1962 and the early 1970s that provided guidelines for the development of air rights from an economic, technical, environmental, and sociological perspective. The literature, which frequently referred to the Washington Heights development, provides a cogent lens through which to view the motivations and problematic connections made within this unique development form.

The authors of air-rights literature frequently discussed the obvious pollution problems that these

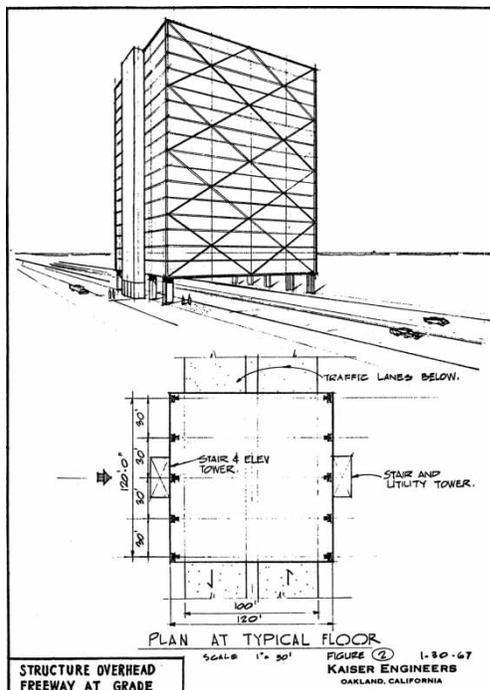
Figure 2. The demolition and relocation plan for the Trans-Manhattan Expressway. (Image courtesy of The Port Authority of New York and New Jersey.)

types of developments presented to their inhabitants. A report commissioned by the State of New Jersey's Department of Transportation — 'Air rights Potentials in Major Highways' — contained an entire section entitled 'Air pollution considerations'. The authors warned that air-rights developments presented some potentially hostile, threatening conditions for the inhabitants of buildings built over freeways: 'The adverse effects of CO (carbon monoxide) on humans are so pronounced that air with only 0.02% (200 parts per million) may produce characteristic symptoms in a few hours...headache, mental dullness, physical tiredness, dizziness, and even nausea.' The authors were particularly concerned with the long-term effects of CO exposure, and locating housing above roadways potentially increased the likelihood of CO poisonings in cities. They continued: 'A direct relationship exists between traffic density and CO concentration at the roadway level. Some freeways in large cities with concentrated traffic volumes have registered localized CO pollution levels as high as 80 ppm.' They ultimately concluded that buildings built in the air-space over highways 'should be located in such a manner that highway generated CO concentration at the building will not exceed an average of 5 ppm for an eight-hour period or an average of 10 ppm for a one-hour period.'³

For the authors of air-rights literature, the amelioration of pollution was primarily a technical and demographic problem. Consequently, on the one hand technology could counteract the problems of air rights and on the other, certain types of high-income generating buildings could off-set the expenses of 'CO proofing' specific urban spaces.

The inter-weaving of the economic and technical realities of air-pollution abatement in air-rights developments offers the most salient perspective on their appeal. In a 1961 report on air-rights building above highways by the American Association of State Highway Officials, the authors stated that examples of highway-compatible air-rights buildings include parking garages and office buildings as '[t]he tenants of office buildings are active and are usually enclosed in an air-conditioned environment...'. Apartment buildings were generally discouraged as 'the occupants of apartment buildings — even buildings with the same quality of insulation and air-conditioning — often may be disturbed by freeway noise, especially during sleeping hours.'⁴

However, the authors suggest that middle-class and upper-middle class development would probably be the most successful type of living accommodation to incorporate in air-rights schemes based on their more sophisticated aggregations of technology: 'As demonstrated by the Sutton Place apartment buildings over the East River Expressway in New York City, high-rise apartments can be compatible with freeways under proper circumstances.'⁵ As a potential tax generator and environmentally vulnerable space, the encouragement of specific forms of technologically and therefore demographically rich buildings — whether they be office buildings or middle-class apartment buildings — was to be encouraged (Fig. 3). These concepts were reiterated in a study funded by the US Department of Transportation and conducted by highway planners who examined the economic returns possible in air-rights development. Their conclusions were that '[w]ith few exceptions, only high-density projects



from those problems. However, the amelioration of pollution problems occurs within the context of demographically lucrative buildings. Air-rights housing announces itself as a financially rewarding response to the problems intentionally introduced by its very processes into the city. It participates in enhancing the idea of the 'already existing' city as an inept responder to the environmental threats of late modernity. In other words, air-rights schemes are one of the first forms of development that transform the experience of pollution within specific areas of the city to enact the gentrification of that area.

All of this theorising comes into sharper empirical focus when we consider the demographic realities that surrounded the development of the Trans-Manhattan Expressway. The proposed highway would cut through the centre of the Washington Heights neighbourhood on the upper peninsula of Manhattan, a neighbourhood that in the early 1960s transformed from a population of middle-class German Jews, Irish and Cubans into one of working-class Dominican immigrants. According to Stephen Lowenstein, the neighbourhood was already considered a 'downhill' area in 1954, a process that he says began in 1951.⁷ A concurring description comes from Ira Katznelson, who in one of the most famous studies of New York City focused on Washington Heights wrote: '...by 1960 a significant proportion of the area's housing was dilapidated or deteriorating. Under 75 percent of the units in South and East Washington Heights were considered sound.'⁸ Washington Heights was one of the earliest and most significantly affected sites of the earliest stages of de-industrialisation in

Figure 3. An image of a highway air-rights building from a Federally-funded study of highway air-rights development, 1967.

that are able to sustain high site costs will be able to make economic use of airspace.⁶

The literature on air-rights development presents some new and potentially alarming correlations between development, highway pollution and the amelioration of these problems through further, select forms of development. The air-rights planning schemes of the late 1960s and early 1970s may be the first form of planning that involves the simultaneous introduction of environmental problems in the city and the development of a sheltered space

New York City. As Katznelson states: 'As the urban economy that had sustained pre-war Washington Heights-Inwood and its working-class population disappeared, the community began to shrink. The area reached its peak population in the 1940s. Two decades later the population of South Washington Heights had declined by 27 percent.'⁹

The Trans-Manhattan highway demolition that began in the late 1950s had already destroyed several of the 'softest' areas of the neighbourhood. The Municipality of New York City, which owned the air rights over the State and Federally subsidised highway project, sold the air rights in auction to the Kratter Corporation in August, 1960, which paid \$1,065,000 for the development contract. Kratter financed the future project with a \$17,658,000 mortgage loan from the State and 40 per cent tax abatement from the City municipal government. In 1961, with the ownership and federal approval of the air-rights structures secured, Kratter and its architects, Guenther Brown, unveiled their vision for the Washington Bridge Apartments: four slender, aluminium-clad towers, which incorporated ventilation and air-conditioning systems. The apartments promised a new type of living experience, with 960 units cast aloft a highway (a symbol of middle-class emergence) providing a refuge from its fumes and dirt. Together with the Nervi-designed bus station (begun in 1961) the entire complex appeared as an innovative exercise in the physical and environmental aspects of urban planning and urban highway development. *Empire State Architect* magazine noted the technical innovations of the Apartments, in particular the massive platforms with ten foot-deep girders that supported the apartments and the aluminium skin, as

well as the parking facilities and public park, all situated above the highway.¹⁰

In a study of Washington Heights published in the *New York Times*, the transformative role of the proposed Washington Bridge Apartments and the larger extension complex becomes increasingly clear. Carl Gerwitz, in an article entitled 'Washington Heights Reverses Tide of Urban Decay', wrote of the environmental beneficence of Washington Heights as an aspect of its enduring appeal: 'Thirty years ago, physicians advised their patients to move to Washington Heights for its "mountain" air and its pure drinking water. The air and the water are still good, but the area — once a prime residential neighbourhood — has been stagnating. Today, with a modest building boom underway, civic leaders and public officials are laying the foundation for what they hope will be the rejuvenation of the Heights.' Gerwitz noted that the 'conditions' in Washington Heights' deteriorating neighbourhoods were 'not bad enough to warrant bulldozing entire blocks. But pocket slums — primarily brownstones and wooden frame houses where families share one room — and many rundown tenements signal the beginning of urban decay.' Gerwitz also observed that the Washington Bridge Apartments were one of several developments in the area that planners would use 'to reverse this trend' and that the Apartments were 'expected to spur new private initiative — either through new buildings or rehabilitation of existing housing.'¹¹ Paralleling Gerwitz's assessments, Frederick Elias, the vice-president of construction for the Kratter Corporation, noted tersely: 'One nice building in a bad spot can act just the reverse of one bad apple in a barrel.'¹²

Building the Bridge Apartments

The Washington Bridge Apartments and the Port Authority bus station were sensational new elements in New York City's postwar planning efforts. Although the bus station designed by Pier Luigi Nervi was far more innovative architecturally, both buildings were lauded in the architectural press. Critics admired the construction system in the bus station, particularly noting the techniques Nervi used to ventilate the building with formally robust concrete work; the extensive use of an aluminium curtain wall in the Brown and Guenther building appeared as an equally innovative response to the conditions of the highway below. However, of the two buildings, the Bridge Apartments was far more controversial, particularly as it seemed to embody new risks in the planning of urban space. As construction of the Bridge Apartments continued, various groups protested about the development precisely on environmental grounds. Soon after completion, these groups, together with the residents of the building and governmental agents, questioned the motivations and milieu in which the building was built.

In 1963, following the construction of the four towers, the Bridge Apartments began to attract tenants. The towers imbued the former tenement-laden residential neighbourhood with a sense of technological futurism (Fig. 4); the architectural critic Fred Bernstein recalled, '... being dazzled by the sleek, aluminium-faced buildings, which resembled the Girder and Panel building sets I loved to play with. To my mother, who had grown up in a Bronx tenement, and my father, the child of the Williamsburg "projects", the shiny new buildings by Brown and Guenther were luxury

housing.'¹³ While the apartments quickly filled with tenants, they also emerged as symbols of the risks then involved in urban design. According to Bernstein's own account of the earliest years of the towers, visitors to the buildings had doubts as to the trade-off of cheaper rents for exposure to the highway. Although proximity to the highway was advertised as a visual and functional 'amenity', numerous visitors saw the potential pitfalls of pollution and noise. And, while the developers claimed that the apartments would bring residents into a spectacular relationship with the city — albeit in a protected context — several of the initial planning features were dropped due to cost overruns: the integrated interior ventilation and air-conditioning systems and the parking spaces, both of which would have provided additional protection for residents in the removal of exhaust fumes.

The inherent risks of the project were apparent to some in its earliest stages. Many within New York City voiced opposition to a project that not only naturalised the driving of highways through urban areas but that also seemed to put residents' lives in danger. Hazel Henderson, who formed the Citizens for Clean Air group in 1963, recalled: 'We protested the construction of the apartments. These protests began before the buildings were even constructed. We just thought how could you make anyone live there above the highway... We used scientists, architects and planners at Columbia University to back up our own problems with development in New York City.'¹⁴ In 1964 Henderson's organisation fostered the first study of the air surrounding the Bridge Apartments — conducted by the New York City Department of Air Pollution Control — which

Figure 4. One of the first aerial images of the Washington Bridge Apartments. (Courtesy of The Port Authority of New York and New Jersey.)



concluded that the pollution level in the area was 'undesirable' but 'not dangerous'.¹⁵

Without adequate protection from the highway's fumes, protests from the new residents of the apartments began almost immediately and became publicly visible in 1967. Ridiculing the early advertisements for the Bridge Apartments, Steven Roberts wrote: 'New York's Most Fabulous Big-Family Opportunity ... Many of the development's 960 tenants, however, would not go along with the description of life above a 12-lane highway.' One tenant whom Roberts interviewed and who lived on the fifth floor

of the building claimed: 'If I were to open the windows you would soon find yourself shouting ... the noise becomes very irritable. It's constant. It can drive you to distraction.' Another tenant stated: 'We just moved from the 14th to the 28th floor to try to get away from the fumes ... We have to rent air-conditioners from the management to keep our windows closed to keep from being asphyxiated.' Residents of the building illustrated the problems by conveying to reporters that apartments were being vacated almost daily. Abe Grodd, the managing agent for the Kratter Corporation countered by

arguing that 'some tenants might be moving because the rent had just been raised from an average of \$29 a room a month to \$31.'¹⁶

In response to the complaints of tenants, Henderson's group sought ways to bridge the open spaces between the apartments by sealing them off from the fumes below and venting the fumes up and over the apartment units. The cost of protecting the apartments amounted to approximately \$500,000, based on estimates from the Port Authority. However, the State expected the owners of the buildings to pay these expenses; Seymour Goldsmith, an executive for the owners, argued that 'the situation was not dangerous, and that the company had no plans to alleviate the noise or fumes.'¹⁷ In recounting his work on the apartments, Bernard Guenther, their architect, claimed: 'We were very concerned about the noise and pollution factors... But the highway was being finished at about the same time as the buildings, and we couldn't fully assess what impact the traffic would have.' The blame for the exposure was placed with the Port Authority: 'As a condition of its agreement for the use of its air rights, the Port Authority required that the spaces between the buildings be left open to facilitate the ventilation of the bridge approach.' Guenther continued: 'Leaving the spaces open helped their pollution problem... and it helped create ours.' Like Henderson, Guenther argued that platforms would 'seal off the highway, which would be ventilated through exhaust ducts leading to the buildings' roofs.'¹⁸

In 1967, Henderson's group arranged for Senator Robert F. Kennedy to visit New York City to address the relationship between planning, pollution and

state-level monitoring of urban environmental deterioration. In a heavily publicised tour, Kennedy flew across Manhattan in a helicopter observing some of the city's most polluted sites and visited residents of the Washington Bridge Apartments, including Esha Bhavanandan, who occupied a third-floor apartment with her husband. Kennedy was struck by the straining voices used to hold a conversation on the building's terraces and the residents' consistent complaints of 'dirt, dust and fumes' which 'made it impossible to use the terrace or open the windows.'¹⁹ At the conclusion of his visit Kennedy addressed Henderson's Citizens for Clean Air, where he delivered a speech that attacked the invidious nature of carbon monoxide in New York City, particularly in relation to the planning of the Bridge Apartments; he demanded the immediate amelioration of these problems. Such a vocal call to alleviate the pollution problems of a single housing project was unprecedented in New York City.²⁰ Yet, despite the force of Kennedy's and Henderson's outspoken critiques, they both failed to address the wider effects of this particular development on the entire neighbourhood or any broader conceptualisation of the environmental risks in Washington Heights; rather theirs and others' efforts actually continued the emplaced discourses focused on the protection of the middle-class body within this unhealthy precinct.

Salvaging the Bridge Apartments

The continued efforts of local, Municipal, State and Federal groups to re-think the Washington Bridge Apartments and the desire for the additional air-rights developments in New York City resulted in

the first Federally-funded study of indoor air by the Environmental Protection Agency. Beginning in 1970, scientists measured carbon monoxide levels in both the Bridge Apartments and a 'typical' prewar building in Lower Manhattan to compare their ability to protect residents from pollution. The study concluded that the configuration of the Washington Bridge Apartments actually encouraged the drawing of carbon monoxide from the roadway into the building. Indeed, the apartments actually contained higher levels of carbon monoxide inside than the roadway below. However the study's most provocative conclusion was that the prewar office building, with its casement frame windows and brick skin, contained even higher levels of indoor air pollution than the apartments, despite the fact that only 7000 cars per day passed through it, as compared to 150,000 in the Washington Apartments.²¹

Salvaging the Bridge Apartments, in many ways, the study argued for the continuation of these types of technologically advanced structures as strategies to combat the pollution of the late-modern city. In their guidelines for future planning, the authors produced what might be the first postwar guide to armouring buildings against air pollution in cities. As the study essentially validated air-rights housing schemes, other visions of protected spaces adjacent to the polluted conditions of highways emerged in the city. Mirroring the general development attitudes of the Bridge Apartments, but abandoning its aesthetic vision of an integrated city, the newly proposed 'Confucius Plaza' development in the Chinatown area promised a new, more technically sophisticated form of gentrification than that proposed in the Bridge Apartments. Like the Bridge Apartments,

Confucius Plaza incorporated middle-income apartments and public programmes — including a school and park — but the Plaza's architects proposed the more aggressive strategy of wrapping the building with the exit ramp of the Manhattan Bridge's upper platform. A spokesman for the project explained: 'The site would otherwise be "completely wasted space ... [t]his is where motorists, backed up across the Manhattan Bridge would have thrown their crushed cigarette packs."'

Like the Bridge Apartments, the project was advertised as 'a structure that will combine shelter, education and transportation' and one that would address the problems of building above a roadway. However, the architects and engineers proposed the very first use of an extensively sealed curtain wall on a large-scale, middle-class apartment tower in New York City. The developers acknowledged 'that there were "obvious problems" in wrapping a highway around a school and an apartment house — noise, vibration and pollution from exhaust fumes.' However they claimed that '[s]tudies are being made and we are confident that these problems can be solved.'²² The resultant building, which was literally wound around with traffic, would yet again offer an image of a protected space in an otherwise intolerable zone of the city. The realised project incorporates many of these features but in a far less performative structure than the Bridge Apartments that reflects a more modest role for the robust expression of technological innovation. By comparison, the Bridge Apartments represented a far more middle-class-utopian vision of planning: that is, the development of a form of luxury in the face of environmental adversity.



Figure 5. The Washington Bridge Apartments today. (Photograph courtesy of Bridge and Tunnel Organisation.)

As developments such as Confucius Plaza circulated in the city's popular and architectural press, the problems of the Washington Bridge Apartments were being forgotten by both the Municipality, State and Federal oversight agencies. Following a rent strike in the early 1970s that protested about the deteriorating conditions in the building, many of the middle-class residents quickly departed. In the ensuing years the residents of the Bridge Apartments

became primarily working-class Dominicans. The buildings were transformed from an utopian image of a middle-class metropolis to a curiosity of a bygone period of naïf planning (Fig. 5). In the most recent profile of the buildings, residents expressed self-satisfaction in their ability to adapt to their unusual context; fears of terrorism overshadowed any environmental problems posed by living above a freeway. In 2002, the management realised

(to some degree) the planners' original intention to construct an isolated interior space above the highway by replacing the existing windows with newer more exhaust-proof versions.²³

Conclusion

The Washington Bridge Apartments represent one of the first forms of planning in New York City that simultaneously introduced pollution into the city while also providing a space protected from it. As extreme as the Washington Bridge Apartments may appear today, the constellation of ideas they represent continues into the present. In the mid 1980s, developers proposed more tempered versions of air-rights planning in the neighbourhood directly abutting the Manhattan Bridge in Chinatown. In what the Koch administration dubbed 'The Special Manhattan Bridge Planning District', developers proposed creating an enclave from the fumes of the Manhattan Bridge for three luxury apartment buildings. The strategies of the Washington Bridge Apartments also continue into the present through the greening of environmentally questionable sites such as Lower West Manhattan. The advertisements of the 'Sol-aire' apartment complex in Battery Park City promise future residents 'double-filtered air' in a context known for its profusion of unhealthy dust from the World Trade Center collapse and the massive re-development of the area produced by buildings such as the Sol-Aire. By linking pollution, architecture, planning, and demographic engineering, the forces behind the Washington Bridge Apartments produced new material and discursive urbanisation strategies that re-developed Washington Heights

and that continue to motivate new forms of urban re-development. Rather than representing the end of an era of naïf planning, the Washington Bridge Apartments embody a new form of architecture and planning that negotiates the abject matter of the city as a force of urban change.

Notes and references

1. See J. C. Ingraham, 'New Bridge Links Planned Uptown', *New York Times (NYT)*, 1967.
2. See American Association of State Highway Officials (AASHO), 'An information guide on air rights above and below interstate highways' (October 7th, 1961), p. 10.
3. State of New Jersey, Department of Transportation, 'Air rights Potentials in Major Highways' (1969), p. 20.
4. AASHO (October 7th, 1961), p. 13.
5. AASHO (October 7th, 1961), p. 14. The Sutton Place apartment building is in one of New York City's wealthiest neighbourhoods and is partially built over the East Side Drive Highway.
6. US Department of Transportation, Federal Highway Administration, Bureau of Public Roads, 'A Study of Airspace Utilization' prepared for the California Division of Highways by Real Estate Research Corporation in cooperation with the Office of Research and Development Bureau of Public Roads (1968), p. 2.
7. S. M. Lowenstein, *Frankfurt on the Hudson* (Detroit, Wayne State University Press, 1989), p. 213.
8. I. Katznelson, *City Trenches: Urban Politics and the Patterning of Class in the United States* (New York, Pantheon Books, 1981), p. 97.
9. *Ibid.*, pp. 96–97
10. In an advertisement in the *NYT* the developers put forward, most succinctly, their vision of the new development: 'Opening Tuesday, September 4th...New York's spectacular middle-income housing achievement! Here are the first completely aluminum-clad tower apartment

buildings in Manhattan, located on one of the highest points on Manhattan Island. These four 32-story aluminum towers are built directly over the bridge approach...offering you true "in-the-sky" living with unsurpassed views! Truly breathtaking! Bridge Apartments has spacious layouts, 20-foot balconies... modern conveniences and luxury touches everywhere. Here you will find living features usually expected in apartments renting for far more than \$28 a room per month — yet it's all yours at real middle-income rentals. Bridge Apartments tenants will have available for their convenience, a block-long park, playground facilities, and restful sitting areas, all safely protected from street traffic. Transportation: the new Port Authority Bus Terminal is a block away; subways and busses to everywhere are readily accessible; unexcelled auto connexions to all highways and expressways.': from *NYT* (September 2nd, 1962), p. 167.

11. C. Gerwitz, 'Washington Heights Reverses Tide of Urban Decay', *NYT* (July 1st, 1962), p. 169.
12. *Ibid.*, p. 169.
13. F. Bernstein, '40-year watch: Bridge Apartments by Brown and Guenther', *Oculus*, 65: 4 (2003), p. 47.
14. H. Henderson, interview with the author 02/02/06.
15. H. Henderson, interview with the author 02/02/06 and S. Roberts, 'Fumes and noise plague tenants', *NYT* (June 17th, 1967), p. 33.
16. S. Roberts, 'Fumes and noise plague tenants', *NYT* (June 17th, 1967), p. 33.
17. H. Henderson, interview with the author 02/02/06 and S. Roberts, 'Fumes and noise plague tenants', *NYT* (June 17th, 1967), p. 33.
18. R. Tomasson, 'Air rights building is 10, and struggling', *NYT* (February 24th, 1974), p. 351.
19. D. Bird, 'Kennedy warns of air pollution disaster', *NYT* (June 20th, 1967), p. 41.
20. Kennedy proclaimed: 'The second major source of pollution is carbon monoxide. Carbon monoxide from

cars and trucks comprises roughly one-thirds of the pollution in New York City's air. Although it currently is less of a threat to our health than sulfur oxides, the Public Health Service found that carbon monoxide reaches dangerous concentrations in a number of areas in the city, such as tunnels or heavily travelled streets and highways. One area is in the vicinity of the George Washington Bridge Apartments which I visited this morning. These apartments are located directly over the Manhattan approaches to the George Washington Bridge where clouds of carbon monoxide and other car exhausts constantly billow up to poison the surrounding air. Residents of these buildings are continuously exposed to excessive levels of carbon monoxide, an exposure that can lead to decrease in mental acuity, creates cardiac symptoms in patients with heart disease, promotes fatigue, headaches, dizziness, nausea, vomiting, and can cause death....The choice of this location for these apartments, astride one of the most heavily travelled highways in New York City, shows a total disregard for environmental factors on the part of our city planners. Immediate relief is needed for the residents of these apartments. I urge that Federal, State and City funds be used on a crash basis to build a vapor-proof barrier over the sections of this interstate highway that pass underneath these apartments.' For the full copy of the speech see R. Kennedy 'Statement of Senator Robert F. Kennedy to the citizens for clean air.', June 19th, 1967. (Robert F. Kennedy Senate Papers, Speeches and Press Releases, 09/11/66–09/10/67, Box 3.)

21. For the report and the nature of the study see Environmental Protection Agency, 'Indoor-outdoor carbon monoxide pollution study', Office of Research and Monitoring (1972).
22. D. Shipler, 'A Circular Urban Complex offered for Chinatown', *NYT* (February 13th, 1969), p. 91.
23. See David Chen, 'Learning to sleep as trucks roar through the basement', *NYT* (June 18th, 2004), p. B2.

