PART THREE:
Appendices and Acknowledgements

Inventory of Decking Opportunities over Transportation Properties

Appendix A: Task 2 Literature Review

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Cover image:
Parcel B6000: Oak Point Rail Yard, Bronx (September 2006)

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INTRODUCTION

This literature review is the background research component of the *Inventory of Decking Opportunities over Transportation Properties* project. The project will create a comprehensive inventory of approximately 500 parcels in New York City that have land use potential and are located either: 1) above a subgrade section of road or rail routes; or 2) above rail yards, even if they are at or above surface level. The inventory will list and graphically display, corridor by corridor and parcel by parcel, each potential site. Surrounding zoned densities – measured by a floor-to-area ratio (FAR) – will be included to provide context for appropriate land uses along each corridor. Together with the inventory of parcels, this reference work can be used by both public-sector policymakers and other decision-makers looking for examples of transportation air rights uses.

"Air rights" can be defined as the airspace immediately above (or below) a parcel of land's primary use. In this study's case, that use is a transportation corridor (road, transit or long distance/commuter rail). For most parcels considered in the inventory, the actual "envelope" needed to allow for the safe clearance of road and rail traffic ranges from around 16 to 24 feet above the roadway surface or base of rail. This space is inviolable, and nothing can be built that would block those minimum clearances. However, above that, something could be built on a deck above the travel envelope. These air rights could remain property of the City or another public entity, or they could be leased or sold to a developer.

Below are several reasons why this inventory of transportation air rights parcels is needed.

1) New York City has a finite amount of land and its population is growing. From the first landfills of Dutch colonial New Amsterdam through Battery Park City, New York City and the adjacent entities which it would later absorb expanded the developable surface area within the five boroughs immensely. Most of these projects were piecemeal and incremental, such as the gradual expansion of the Battery in the 17th, 18th and 19th centuries. Others, such as LaGuardia Airport, altered parts of the City's shoreline quickly and dramatically. However, increasing environmental awareness of landfill's negative impacts appears to have put a stop to this long-running practice. (The failed attempt to build Westway is illustrative.) With DCP and other estimates of City population totaling over 9 million people by 2030, more space is going to be needed for apartments, offices, shops, schools, parks, police and fire stations, cultural institutions and all of the other things New York City needs to thrive and prosper.
2) Transportation arteries can divide communities, and this damage should be repaired if the surrounding neighborhoods would benefit from being reunited. For example, most of the city's limited-access highways divided existing communities. Encouraging the reuse of land above these highways may be a way to repair the damage caused by such divisions.
3) The City and the agencies that own or operate transportation corridors with air rights are not realizing revenue opportunities. The Metropolitan Transportation Authority, the Port Authority of New York and New Jersey, Amtrak, and both the New York City and State departments of transportation could receive significant lease payments, property tax revenues, and payments in lieu of taxes from making use of these air rights.
4) Decking over a transportation corridor may benefit the corridor's users. This is especially true for rail, where inclement weather such as snow can indirectly hamper operations. On the subway system, this usually happens when snow forces trains to be stored underground on express tracks, limiting express service.

This literature review includes examples of transportation air rights land uses – both in New York City and in other cities around the United States. These examples could point the way toward best practices for New York City's public and private stakeholders. Sometimes, as the example from Duluth, Minnesota demonstrates, the path to such end uses can be long and circuitous. Information about how other cities overcame such obstacles can only help New York, whose inventory of land with air rights over transportation properties exceeds the total acreage of Central Park.

The examples found in this document were chosen because they represent a range of land use types, obstacles and outcomes. A definitive catalogue on air rights has yet to be written in this country, although an inventory of decking projects nationwide done for the City of Sacramento, California comes close. In addition to examples of air rights land uses, this document includes a summary of materials related to the technical aspects of air rights, such as parkland alienation and highway airspace guidelines. Institutional policies also play a critical role in determining the viability of an air rights proposal.

1: EXAMPLES in NEW YORK CITY

New York City has several prominent examples of air rights development. Grand Central Terminal is the best known in planning circles, with its “Terminal City” that gradually covered over the rail yards north of the terminal in the 20 years following its completion in 1913. Manhattan drivers may be most familiar with the buildings above the FDR Drive and the Trans-Manhattan Expressway, the latter of which is discussed herein.

Less well-known, and harder to find documentation about, are housing complexes built above New York City Transit’s Lenox and Pitkin yards. Newkirk Plaza, a pioneering pedestrian shopping mall with a subway station as its centerpiece, is probably older than Grand Central Terminal. (The plaza’s exact opening date is somewhere between 1907 and 1913, but specifics remain elusive.) More recently, in 1972, Herbert Lehman High School’s building opened, a portion of which is above the Hutchinson River Parkway.

The following chapter provides examples of both the promise and pitfalls of building above a transportation corridor, especially in the case of the Bridge Apartments, which straddle the Trans-Manhattan Expressway.

"WITH THE SURROUNDING BUILDINGS IT COVERS AN AREA OF THIRTY CITY BLOCKS . . ."

NEW YORK TIMES ARTICLE, FEBRUARY 2, 1913

Published in 1913, this article describes the new Grand Central Terminal (GCT) as it opened its doors to the public. Grand Central Terminal, located in Manhattan, replaced Grand Central Station. It is also an early example of "decking over" railroad tracks to allow for revenue-generating real estate development.

In the early 1900s, the station and yards were owned and operated by New York Central Railroad (NYCR). After a gruesome railroad accident in which two steam engine trains collided in the tunnel below Park Avenue, the New York State Legislature mandated NYCR to change from the steam engine to electric propulsion.

With the introduction of the electric engine, GCT was no longer confined to open cut rail yard design. Up until this point, a rail yard occupied an open cut along Park Avenue between East 45th Street and East 56th Street. The electric engine enabled GCT to cover Park Avenue and surrounding areas, thus reclaiming the real estate:

> "... [T]he builders of the new terminal developed the idea of roofing over the tracks and the trains and building above them as though [the] road had suddenly came into possession of scores of vacant lots."

In this area of the city, vacant lots of land were "worth between $2,000,000 and $3,000,000." The newly-acquired revenue generated from these city blocks financed the redesign and construction of the new Grand Central Terminal.

> "The entire scheme involves the use of some thirty blocks. Part of this the railroad already owned. Part of it had to be specially bought, but the idea of using air rights reduced by an immense sum the cost of the terminal."

Today, Park Avenue immediately north of Grand Central Terminal is prime real estate. It has become so enmeshed into the urban fabric that it is hard to imagine Park Avenue with the former open cut rail yard design before Grand Central Terminal.

A STUDY OF THE OPPORTUNITIES AND POTENTIAL USE OF STATE HIGHWAY AIRSPACE IN NEW YORK CITY

By ABELES PHILIPS PREISS AND SHAPIRO, INC.; GRUZEN SAMTON; HENNESY AND PLUMMER; and VOLLMER ASSOCIATES. For the NEW YORK STATE DEPARTMENT OF TRANSPORTATION (NYSDOT)

Published in January 1995, *State Highway Airspace* is a thorough analysis of developable NYSDOT-owned locations over, under and adjacent to highways. The idea had its genesis in the booming real estate market of the 1980s. By the time the report was published, the market had cooled considerably, but enough development revenue potential remained to continue the study and target specific areas.

The project had five components: a) an evaluation of the regulatory context of such development, b) an inventory of potential sites, c) an analysis of each site's market potential, d) an analysis of different management strategies that NYSDOT could use for implementing this concept, and e) a discussion of prototypes for air rights development. This review will primarily be concerned with items a and b.

When this report was written, both New York State law and New York City DOT policy dictated that local land use regulations must prevail when developing air rights, unless overridden by a state agency, such as the Empire State Development Corporation.

The New York City Department of City Planning's (DCP's) position was somewhat more ambiguous. DCP interpreted the Zoning Resolution as not permitting the designation of lots above or below highway airspace. The official City map would need to be amended to permit this kind of development, and both a state legislative and a City action are required for this to happen. These actions are necessary because a mapped highway includes the airspace above or below it, and the space under or on top of the travel envelope of the highway would need to be demapped as a highway, even though that roadway itself would obviously continue to exist. An example of this situation is Herbert Lehman High School, located at East Tremont Avenue above the Hutchinson River Parkway in the Bronx. While the project was in the planning stages, the New York State Legislature, under Chapter 723 of the Laws of 1964, "closed" the highway at street level, thus freeing up the airspace for a non-transportation use. In 1969, the New York City Board of Estimate passed the necessary map change allowing an aerial easement.[1]

The 1995 NYSDOT study also states that surplus or peripheral land adjacent to a highway and falling under NYSDOT ownership would have to be demapped and rezoned in order for development to occur. (If this peripheral land falls under New York City Parks and Recreation's jurisdiction, alienation would also be required.) Unused air rights from adjacent parcels could then be transferred to the land above (or below) the highway. Land use review processes, including the Uniform Land Use Review Process, the City Environmental Quality Review, and the State Environmental Quality Review would also be triggered, because this is a mapping action.

The report also states that jurisdiction must be established before air rights development could proceed. This means that the resolution of the long running ownership and maintenance debate surrounding which agency has control of which parts of the City's parkway system would need to be addressed. Adding to the regulatory tangle was a concern that most of NYSDOT's developable airspace would involve so many complicated issues that a tremendous amount of staff would be needed to address them.

As noted earlier, the study was not limited to decking over subgrade properties. In fact, the project perceived to be most viable involved developing several parcels under the Brooklyn approach to the Kosciuszko Bridge, for use as parking space or a tow pound.

State Highway Airspace identified 52 potential sites along 13 different corridors; consultation with DCP and other public agencies reduced this list to 20 by using six screening criteria:

[1] Demapping is also required for the vertical shaft spaces that are needed for support columns.

1. Locational attributes (with an allowance for encouraging sites scattered throughout the five boroughs),
2. Physical attributes (with an allowance for encouraging a mix of decking over, building under, and building alongside highways),
3. Likelihood of expeditiously clearing regulatory review(s),
4. Physical developability,
5. Potential revenue for the state, and
6. Likelihood of community and official acceptance.

Of these 20 sites, 10 were selected as being most viable and worthy of further study. It is interesting to note that the BQE Hicks Street cut was added into the top 10 at the expense of the Van Wyck Expressway and 134th Street, due to Hicks Street being very politically popular and it being the highest-ranked project that would exclusively be a deck.

The final rankings (with borough and type in parentheses) were:

1. BQE, under the Kosciuszko Bridge, Brooklyn approach (Brooklyn) (underbuild)
2. Nassau Expressway/Belt Parkway, at JFK Airport (Queens) (adjacent build/underbuild below ramp; this was seen as a potential airport hotel development)
3. Grand Central Parkway, east of 94th Street (Queens) (adjacent build; also an airport hotel)
4. end of Martin Luther King Jr. Expressway, at Victory Boulevard (Staten Island) (adjacent build)
5. (tie) Staten Island Expressway Richmond Avenue Exit and Lamberts Lane (Staten Island) (adjacent build), and BQE at Broadway and 65th Street (Queens)
7. Van Wyck Expressway at Queens Boulevard exit (Queens) (adjacent build/deck)
8. (tie) BQE at Hicks Street Cut (Brooklyn) (deck), and Martin Luther King Jr. Expressway/Staten Island Expressway/Christopher Lane (Staten Island) (adjacent build)
10. FDR Drive at 60th Street Heliport (Manhattan) (adjacent build/deck)

I-278: BROOKLYN HEIGHTS PROMENADE

(photo: http://www.nycroads.com/roads/brooklyn-queens/)

Ideas for a public waterfront promenade in Brooklyn have existed since as far back as 1827; the idea came up again at the turn of the 20th century. With World War II underway, Robert Moses proposed an extensive highway system throughout New York City to transport military supplies and evacuate people if necessary. Moses' original plan for the Brooklyn Heights neighborhood was to "improve on a recently completed direct traffic link from Queens to Tillary Street and to extend it southward to join the Gowanus elevated highway."[2]

The City Planning Commission floated several ideas for the Brooklyn Heights neighborhood before settling on a plan that would cut the neighborhood into two sections. Their plan called for a section "running in a curved diagonal from Atlantic Avenue and Hicks Street to Tillary and Washington Avenues."[3] Residents of Brooklyn Heights were outraged at the idea of a highway dissecting their neighborhood, so "in 1943 the Brooklyn Heights Association prepared an alternative scheme consisting of two three-lane highways, one on top of the other, with a cover on the upper level to shield nearby residents from some of the noise and fumes of the roadway."[4] Fortunately for residents of Brooklyn Heights, Robert Moses liked the idea. The Brooklyn Heights Association plan called for private gardens covering the cantilevered expressway, which would be exclusive to area residents. Robert Moses altered their plans by replacing the private gardens with a public promenade that remains in use today.

[2] Krogius, Henrik, "Pearl Harbor Day: 50 Years Since Promenade's Completion," *Brooklyn Heights Press & Cobble Hill News*, 6 December 2001.

[3] Stern, Robert A. M., Thomas Mellins and David Fishman, *New York 1960*, New York: The Monacelli Press, Inc., 1997.

[4] Ibid.

"LIFE ON THE ROAD; LEARNING TO SLEEP AS TRUCKS ROAR THROUGH BASEMENT"

NEW YORK TIMES ARTICLE BY DAVID W. CHEN, JUNE 18, 2004

"Life on the Road" is a feature piece describing the history of and conditions in the Bridge Apartments, the four 32-story apartment buildings that rise above I-95 between West 178th and West 179th streets in Washington Heights, Manhattan.

The Bridge Apartments' genesis came in 1960, when the Port of New York Authority transferred the air rights over the expressway, which was then under construction, to the City of New York. In a City auction, the Kratter Corporation made the winning bid of a little more than $1 million and assumed ownership of the air rights. The Bridge Apartments were built as Mitchell-Lama housing; construction began the following year, and the first tenants moved in in 1964.

Although initially regarded as something of an engineering feat, by 1967, Senator Robert F. Kennedy said that "the choice of this location for these apartments, astride one of the most heavily traveled highways in New York City, shows a total disregard for environmental factors on the part of our city planners." In 1972, crumbling services within the apartment complex resulted in a rent strike.

The Bridge Apartments had no vacancies at the time the article was written, and businesses occupied ground-floor units. However, noise and exhaust from the expressway below had minimized use of the outdoor terraces – in some cases turning them into de facto outdoor storage closets. Trucks shifting gears, post-Yankees game traffic jams, and gridlock on local streets caused by highway construction also aggravated the many of the development's residents. Chen elaborates:

> "If the windows are open, the noise is most deafening on the middle floors, and people inside find that they need to raise their voices to hold a conversation or talk on the phone. The winds carry vehicle exhaust upward, which is especially noticeable on the terraces. And on most floors, the vibrations of trucks can clearly be felt, along with those of any construction equipment.

> "But if the windows are closed, a typical Bridge apartment does not feel all that different from any other apartment in New York close to a busy road. The panoramic views, imbibing everything from the Tappan Zee Bridge to the Whitestone Bridge, are breathtaking. The location, near two subway stops and the George Washington Bus Terminal in Washington Heights, is convenient. And the apartments, while not cheap, are roomy, modern and rent-stabilized."

At the time this article was written, the complex's windows had been recently replaced with noise-buffering double-pane glass.

In 2004, approximately 4,000 residents lived within the 960 units that make up the four-building development. A studio cost about $700 per month, while three-bedroom units with one and a half bathrooms cost about $1,600 per month.

(photo: DCP staff, 2006)

VISIONS FOR NEW YORK CITY: HOUSING AND THE PUBLIC REALM

By ALEX GARVIN AND ASSOCIATES,
for THE NEW YORK CITY ECONOMIC DEVELOPMENT CORPORATION

Visions for New York City was published in May 2006 by Alex Garvin and Associates. The report seeks to develop new housing without destroying any of the old, citing existing and anticipated population increases in the City and the need to remain economically competitive. Although this document also puts forth proposals for waterfront development and transit-oriented development, this review will focus on Chapter 1 of the publication, "Platform Opportunities."

Visions primarily measures the viability of decking over subgrade corridors in terms of market viability – that is, whether surrounding real estate prices per square foot are equal to or greater than the per-square-foot costs of decking. In the Introduction, the report states: "Rather than responding to vague social needs, this report presents a variety of physically and financially feasible options which may be implemented as they become relevant, depending upon market conditions."

Fourteen sites – mostly in Brooklyn and Queens – are identified as potential platform opportunities, but the report focuses on five of these, which are seen as the most economically viable. They are:

- *Sunnyside Yards*, in Queens. The *Visions* document estimates that up to 28,200 new housing units could be constructed if a platform built over the yards were zoned R8; up to 35,300 units could be built with R9 zoning. The report also states that the grade separation between the yards and surrounding streets is sufficient to create an underground circulation system.
- *BQE-Cobble Hill*. Using an estimated platform cost of $500/square foot, *Visions* states that surrounding property values are sufficiently high to develop the area above the Hicks Street BQE cut in Brooklyn. Between 200 and 1,500 units could be developed here, depending on the zoning designation.
- *Prospect Expressway*, between 7th and 11 Avenue in Brooklyn. Six hundred to 800 units could be developed over this open cut. Residential data from July to December 2005 within half a mile of the corridor indicates that home prices are high enough to recoup most, if not all, of the cost of decking, estimated at $500/square foot.
- *36th Street Yards*, in Brooklyn. This NYCT facility, which lies immediately southwest of Green-Wood Cemetery, has the potential to accommodate between 2,400 (with R6 zoning) and 6,000 (with R8 zoning) units, according to the report. However, market conditions are not yet feasible for making a deck cost-efficient.
- The *Bay Ridge Line* from 8th to 14th Avenue in Brooklyn. Between 800 and 1,300 units could be accommodated here, but again, sales data from the area are insufficiently robust to build a deck entirely based upon market considerations.

Other sites for future study include NYCT's 207th Street Rapid Transit Yards in Manhattan; Coney Island Yards in Brooklyn; Jamaica Yards in Queens; the Gowanus Expressway in Bay Ridge, Brooklyn; the BQE in Williamsburg, Brooklyn; segments of the Clearview Expressway and Cross Island Parkway in Queens; and LIRR segments in Rego Park and Flushing, Queens.

2: EXAMPLES from OTHER CITIES in the UNITED STATES

Many other cities are taking the initiative when it comes to making use of air rights above their transportation corridors. Some are actively cataloguing their air rights; Boston created a comprehensive inventory and land use/transportation plan for the parcels over the Massachusetts Turnpike. A recurring theme in the case studies within this chapter is the desire to knit back together neighborhoods which were divided by highways. Duluth, Minnesota had a similar aim: its rebuilt expressway reopened waterfront access to the city.

These projects were chosen for review because they provide a representative sample of the assorted problems encountered when air rights land uses are proposed and the solutions which break down the barriers that make air rights uses possible.

WILMINGTON, DE:
I-95: PROPOSED I-95 PLAZA

In May 2004, at an economic development conference, Wilmington Mayor James M. Baker and the Citywide Planning and Development Advisory Council released *Visions for Wilmington*, a multifaceted summary of recommendations for revitalizing Wilmington's neighborhoods, downtown core and waterfront.

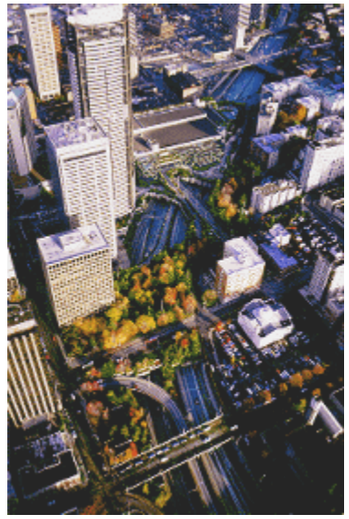
One such proposal was I-95 Plaza, a quarter-mile-long development on a deck over I-95 between Delaware Avenue and West 8th Street that would link the Trinity Vicinity and Cool Springs Park neighborhoods, which were divided 40 years earlier when the highway was built. The proposed development would combine "people-friendly public plazas" and a multistory mixed use development which, "through thoughtful leasing and development could create a perpetual revenue stream for the owners of the air development rights above I-95."

No further developments regarding this project are known.

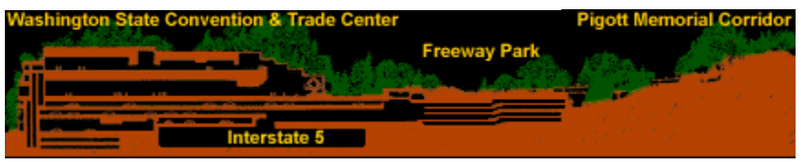
Sources: *Visions for Wilmington*:
http://www.ci.wilmington.de.us/pdf/VisionReport2004.pdf

AARoads Highway Guides:
http://www.aaroads.com/delaware/i-095.htm

SEATTLE, WA:
I-5: FREEWAY PARK



Left: I-5 before Freeway Park.
Center: Freeway Park
Above: I-5 passing under park
Below: Cross-section of park



There are several websites describing Freeway Park in Seattle, Washington. These include Danadjieva and Koenig Associates, City of Seattle, as well as Great Buildings. Interstate 5 in Seattle cuts through the city and separates the First Hill residential neighborhood from the downtown community. After it was built in the 1960s, the interstate cut obstructed pedestrian flow between the two communities. In the 1960s and 1970s the community began complaining about the detrimental effects of I-5. Air and noise pollution negatively affected the adjacent land, decreasing property values, and discouraging economic development.

Under the civic leadership of James Ellis, the Department of Transportation, Parks and Recreation, private developers, and the design firm of Danadjieva and Koenig Associates, plans were developed to build a “lid” over this portion of Interstate 5, which would reconnect downtown Seattle with First Hill and be a source of civic pride.

The master plan incorporated a pedestrian network, park, retail space and exhibition space into the 12-acre site. The plan resulted in the multi-level Freeway Park, which covers 12 freeway lanes, an overpass, an onramp and five city streets. Danadjieva also had to work with a pre-existing 50 foot grade change. The convention center wall blocks air and noise pollution from the highway. Open space is situated so that it faces Puget Sound, which promotes natural ventilation. Bond money and county, state and federal funding financed the project.

Freeway Park was used extensively by park goers when it was first built in 1976 but over time its appeal began to wane. Seattle Parks and Recreation is working to improve the space by fixing some of Freeway Park’s perceived deficiencies. Tree growth will be thinned in order to allow sunlight into the space. Signage and kiosks will help direct people within the park. The fountain will be restored. Freeway Park has been locally nominated for historic landmark status and will be reviewed by the Historic Landmark Preservation Board.

Sources
http://www.seattle.gov/parks/parkspaces/FreewayPark.htm
http://www.dkassociates.com/plan/2.html
http://www.greatbuildings.com/buildings/Freeway_Park.html

COLUMBUS, OH:
I-670: HIGH STREET CAP

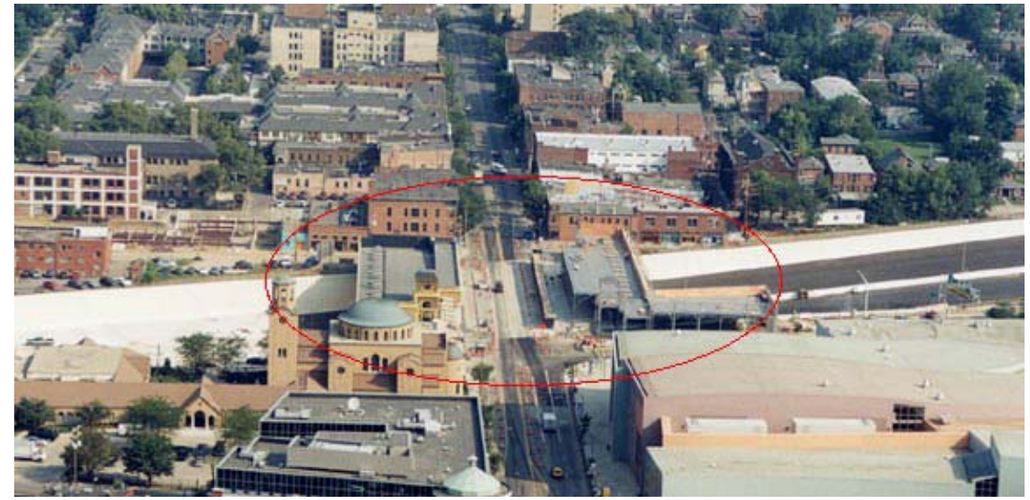
Published in the spring of 2005, *The High Street Cap: Bridging the Gap* features the transformation of the High Street overpass in Columbus, Ohio. The overpass links the Short North Neighborhood with the Arena District and is located over Interstate 670.

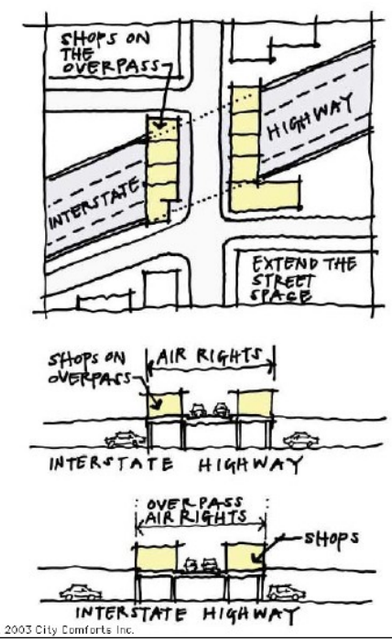
The original overpass was built in the 1960s and pedestrians were discouraged from using it due to narrow sidewalks and high amount of vehicular traffic. The Ohio Department of Transportation (ODOT) decided to redesign the High Street overpass at the same time they were reconstructing that particular portion of I-670. ODOT commissioned a special task force to design a more pedestrian friendly space that would link the Short North Neighborhood and Arena District.

With increased pedestrian use as their primary goal, the special task force proposed transforming the overpass into a larger structure that capped I-670. The new design featured retail structures lining both sides of High Street, meshing the two neighborhoods together. Retail space would hide the highway and as a result "pedestrians on the new bridge would barely notice that they were crossing the eight-lane highway."

Funding for the project came from city and transportation funds. ODOT gave $1 million from their Transportation Enhancement Funds. The city provided $300,000 for support structures on either side of the roadway, including streetscape fencing, lighting and other infrastructure. Continental Real Estate collaborated with the city tc facilitate the retail project. Construction for the retail arcade was also financed by the city (at $7.2 million) and the design incorporated architectural features of the historic Union Station that was once located in the area. The High Street Cap opened in the spring of 2005 with restaurants and retail lining the main street-like pedestrian corridor.

Source: *The High Street Cap: Bridging the Gap. Connections: The National Transportation Clearing House Newsletter.* Vol. 8 No. 2., Spring 2005.
http://www.enhancements.org/download/connections/Vol8no2.pdf
(photos: http://citycomfortsblog.typepad.com/cities/2003/08/i670_cap.html)





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PHOENIX, AZ:
I-10: PAPAGO FREEWAY, MARGARET T. HANCE PARK

Several articles describe the opening of Margaret T. Hance Park in Phoenix. These include:

- Richard F. Weingroff, "The Year of the Interstate," *Public Roads*, January/February 2006. FHWA. http://www.tfhrc.gov/pubrds/06jan/01.htm
- Commission on Engineering and Technical Systems, *In Our Own Backyard: Principles for Effective Improvement of the Nation's Infrastructure*, pp. 47-48. The National Academies Press, 1993. http://darwin.nap.edu/books/0309048788/html/47.html

When it was opened in August 1990, the segment of Interstate 10 that is now covered by Hance Park was the last link in a transcontinental highway that stretched from Jacksonville, Florida to Santa Monica, California. Originally proposed as an elevated highway in the 1960s, the Papago was to be built 10 stories above Central Avenue. Its distinguishing feature was to be a "helicoil" interchange – a series of circular ramps to and from street level. (See rendition at right. Source: Arizona Department of Transportation)

However, the helicoil was abandoned after community opposition. When opened, this segment of I-10 instead ran below ground, decked over by Margaret T. Hance Park, which links communities divided by the highway.

Former Arizona Department of Transportation Director William Ordway, who ran ADOT from the mid-1970s to the mid-1980s, said:

"Painful and costly as were the delays, there's no question that we got a better freeway, friendlier toward the city, with high-occupancy vehicle lanes, and built-in beautification. The combined expertise of all of America's freeway building was available for the Papago."

Thirteen of Hance Park's 29 acres were built atop the half-mile-long I-10 tunnel. It should be noted, however, that because Hance Park and I-10 were constructed at the same time, the project was easier to execute than decking over an existing highway.

An image of the Hance Park Tunnel can be found on Google Earth at: http://www.google.com/maps?ie=UTF8&oe=UTF-8&hl=en&q=&z=16&ll=33.4617,-112.073593&spn=0.008807,0.0156&t=k&om=1

BOSTON, MA:
I-90: MASSACHUSETTS TURNPIKE

A Civic Vision for Turnpike Air Rights in Boston, published in June 2000 under the auspices of Mayor Thomas Menino and the Boston Redevelopment Authority, catalogued and formulated a civic vision for the kinds of development – and adjacent neighborhood improvements – that the air rights above the Massachusetts Turnpike could yield. *Civic Vision* went well beyond a detailed inventory of developable parcels and advocated specific kinds of development for specific areas.

The study was created by a the Strategic Development Study Committee (SDSC), appointed by the mayor, which conducted numerous public meetings with local communities, elected officials and assorted public agencies en route to assembling this report.

The report's overarching goal is stated thusly: "At its most basic level, this *vision* is simple: **replace the physical, social and economic breach presented by the railroad and the Turnpike's cut through Boston.**" (P.1; their emphasis)

Within that context, the study put forth four goals:

- Reinforce the vitality and quality of life in adjacent neighborhoods.
- Enhance Boston as a place to live, work and invest.
- Repair and enrich Boston's public realm.
- Foster increased use and capacity of public transportation and decreased reliance on private automobiles.

The SDSC grouped the 23 potential development parcels totaling over 44 acres along a 2.5-mile-long corridor into five slightly overlapping districts, or areas that share a common neighborhood or zoning context. From west to east, these were:

1. Allston-Brighton, Audubon Circle, Boston University
2. Audubon Circle, Kenmore Square, the Fenway
3. Fenway, Back Bay
4. Back Bay, South End, Bay Village
5. Bay Village, Chinatown, South End

In 1999, estimated decking costs along this corridor ranged from less than $250/square foot to over $700/square foot, depending on the height of the proposed buildings on it and the distance that must be spanned. In 1999, spans of between 48 and 80 feet would have cost $175 to $225 per square foot to support buildings of five stories or less, and $400 to $600 per square foot to support a 35-story building. An additional $75 to $150 per square foot premium was added for Turnpike maintenance, lighting, ventilation, signage, and deck maintenance. Furthermore, the Massachusetts Turnpike Authority would probably demand lease payments for using its air rights. *Civic Vision* estimated the cost of building an acre of land to support a 20-story building at $19,602,000 (before lease payments) – 10 to 15 percent higher than the value of land on solid ground zoned for an 8.0 FAR and valued at $50 per square foot. Such high upfront costs often increase the scale of profitable air rights development.

Even in the robust economy of 1999, developing on these air rights would have been more costly than developing adjacent parcels on terra firma, meaning that large, high-end projects were seen as the only ones feasible above stretches of the Mass Pike. Although such development may only be possible during the strong phase of a real estate cycle, this report established guidelines for all air rights development along the Mass Pike irrespective of how well the economy is doing. More specific guidelines were given for each district based on community needs and surrounding land use and zoning. *Civic Vision* states that public subsidies should be considered in instances where the Mass Pike's air rights can serve a public-sector goal, such as affordable housing, parks or community facilities, but that the private sector would need to develop most of the air rights due to high initial outlays.

Civic Vision also provides an historical context, noting that the Boston-Albany mainline of the New York Central Railroad had already divided the South End from the Back Bay for a century before the Mass Pike was built alongside the train tracks. The two major air rights projects that followed – the Prudential Center (built concurrently with the Mass Pike) and Copley Place – were both urban renewal-style projects which were physically and philosophically out of scale with surrounding neighborhoods.

Civic Vision framed the economic viability of air rights proposals with five questions (P. 39):

- How do the cost premiums associated with the parcel in question compare with the potential terra firma sites, given real estate values in the surrounding area, allowable densities, and uses that are in demand?
- What is the impact of the project on Turnpike Authority lease payments?
- What are the values, per square foot of built space, for the uses that are proposed – how large does the project need to be to compete with comparable terra firma projects?
- Are there other appropriate uses that might generate higher values per square foot, allowing the project to become smaller?
- What is the impact of other feasibility issues, such as unique risk, on the project's economics?" (P.39)

The report provides some minimum estimates about how large certain kinds of projects would need to be in order for them to be economically feasible. (The Massachusetts State Legislature had exempted the Turnpike's air rights from Boston Zoning regulations.) For example, hotels, at 10,000-15,000 square feet/floor would need to be 15-23 stories high; office buildings at 25,000 square feet/floor would need to be 14-21 stories high; and housing developments would need to balance the total number of units with building height (especially since condominiums tend to command higher prices on upper floors). Research/development buildings may not need to be as tall, and may not require as much parking since fewer employees per 1,000 square feet tend to work in them compared to an office building.

CHARLESTOWN, MA:
I-93: CITY SQUARE PARK

In the article, “City Square Park,” the Charlestown, Massachusetts website describes the a project which was built on top of I-93 in Charlestown, MA. This formerly independent city, which was annexed into Boston in 1874, is rich with history. City Square Park was Charlestown’s focal point as far back as its initial European settlement in 1629.

In 1901 an elevated transit viaduct (the precursor of today’s Orange Line) cut a swath through the park into the 20th century. Further degradation of the square occurred in 1950, when traffic from the Tobin Bridge began emptying into the park area, and in 1960 when two new elevated highways passed over the square.

Reclamation of the park began in 1975, when the Orange Line was relocated and the elevated tracks removed. During the 1970s and 1980s, the Massachusetts Highway Department began working on the planning of the Central Artery North Area, a construction project that would cut through City Square Park. Neighborhood groups and elected officials advocated for tunneling the artery underneath Charlestown. Once this proposal was accepted the Charlestown community advocated a plan to dismantle the present highway structure and reclaim the park.

Many groups collaborated on the reconstruction of this park. Childs Bertram Tseckares & Casedino (CBT) assembled the land parcels for the Massachusetts Department of Public Works. In 1987, a staff member from the Department of Environmental Management (DEM) helped the Charlestown community develop one parcel for the reconstruction of City Square. In 1988, the City Square Park Committee was established as a community group to assist in the recreation of the park. Halvorson Company Inc. designed the park from preliminary sketches through the final design.

On July 9, 1992, City Square Park was landmarked. The City Square Tunnels were constructed in 1992, and surface restoration occurred in 1993.

Source: http://www.charlestownonline.net/citysquare.htm

DULUTH, MN:
I-35 EXTENSION

The chapter, "The Duluth, Minnesota Story," from *The Aesthetic Condition of the Urban Freeway* – a graduate student's review of the American freeway system –describes the development of the I-35 Extension in Duluth, Minnesota. Planning for this section of Interstate 35 began in 1958, and the highway had been built by 1968 for approximately $45 million. The Minnesota Department of Transportation met with very little opposition in the construction of this section of the highway, but soon after its completion it became clear that the original road needed to be extended to further reduce traffic congestion. The extension was opposed by many citizens of Duluth; its planning and construction was ultimately to span over 20 years.

In 1971, highway officials proposed an extension plan which would require relocating several rail yards and routing the freeway through the space. In order to involve the community in the highway planning process, the mayor created the Citizens Advisory Committee to work with the Minnesota Department of Transportation and local design firms. By 1976, a new design had been introduced with the goal of uniting the waterfront with downtown Duluth by reclaiming the land occupied by the rail yards. Brainstorming sessions led the Citizens Advisory Committee to propose an idea where "instead of building up, (on the railroad) why not build the freeway down and cover it with a 'lid' atop which could be built a park." The Citizens Advisory liked the plan because the lid would hide the freeway and protect the highway from weather conditions related to Lake Superior. Transportation and highway representatives, however, questioned the plan. The planning process was long and further complicated by lawsuits, which were eventually thrown out.

The next challenge for the I-35 extension involved relocating the rail yards from their current location next to the lake's shoreline to an alternative location. This relocation required the cooperation of various property owners, unions, shippers and railroad companies. It took a decade of planning, two years of construction and an additional $45 million to relocate five separate rail yards from Duluth, Minnesota to Superior, Wisconsin.

Construction of the highway began in 1982, with work on the first tunnel beginning in 1983. The extension opened in phases between 1987 and 1992. Its construction displaced 20 homes and 200 businesses. Several historically significant structures were relocated for preservation purposes. Excess rock from roadway construction was reused to add land along the Lake Superior waterfront parallel to the highway. Lake Place and Lake Walk were created to connect downtown Duluth with the waterfront while Leif Ericson Park was retained.

This multi-decade project resulted in the construction of four cut-and-cover tunnels spanning a thirteen block section of freeway. The initial costs of construction were estimated at $45 million. In reality, the project cost over $200 million. Ninety percent of the project was financed by the federal government, the state of Minnesota paid approximately ten percent, and the city of Duluth covered some minor costs. The 3.2 mile extension won Excellence in Highway Design awards from the Federal Highway Administration in 1992 and 1994.

Source: http://www.mindspring.com/~tbgray/prch4.htm

3: GENERAL PRINCIPLES and TECHNICAL ASPECTS

A regulatory and technical framework is helpful for any study which proposes development that has more than its share of engineering and legal challenges. Developing such air rights is not easy – it requires overcoming more physical and regulatory obstacles than are typically found when developing on solid ground.

Any corridor which would involve the taking of Parks property, regardless of its current use, requires special mitigating measures, which are often done as part of a process called alienation. Since most of New York City's subgrade parkway and highway system (and a few parts of the rail system) contains parkland, this is not an academic issue.

The following two documents were chosen due to their thoroughness in discussing important air rights-related issues.

HANDBOOK ON THE ALIENATION AND CONVERSION OF MUNICIPAL PARKLAND

By the NEW YORK STATE OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION

Published in April 2005, this revised edition of *Alienation and Conversion of Municipal Parkland* explains how to determine whether a park is "alienable," and what needs to be done to bring an alienation from the idea stage to the legislative one.

Alienation is the process of stripping parkland of its legal status as a park, often for the purposes of either using it for another purpose or replacing the park with one at a different location.

Crucial to alienation is the concept that parks are for the unrestricted benefit of the entire public (i.e. no "members only" kind of restrictions) and that decertification of parkland usually demands or requires substitute parkland to be created of equal or greater a) fair market value, b) size, and/or c) potential recreational usefulness. With the exception of parklands that received funding from specific state and federal programs – which have stricter alienation/substitution rules[5] – there is some latitude in requiring that all three of these criteria for substitute parkland be met. However, as general policy, substitute parkland should meet the above three criteria when possible; any sizable project will be subject to environmental review and public scrutiny which can affect the prospects of an alienation bill in a political arena like the State Legislature.

Several determinations need to be made before a piece of parkland is alienated. First, is the land in question really a park? Land can be formally dedicated for such a purpose, and is therefore alienable. However, even if no actual official parkland designation exists, if it looks like a park and is used, mapped and funded like a park, it *is* a park, for the purposes of alienation. Court rulings have also found that facilities such as bicycle paths and golf courses are also alienable. However, the size of the parcel makes no difference in its potential alienability – even parcels a few feet wide are subject to alienation.

State Parks' opinion about transferring parkland from one public entity to another is that, as long as the land is maintained for park purposes, it is not alienation. However, legally this is still an open question. Alienation of parkland requires the approval of the New York State Legislature, which can be a time-consuming process, often taking over a year. The handbook recommends the following eight steps:

1. Determine whether or not proposed the action is an alienation of parkland.
2. Explore other options to avoid using parkland.
3. Involve the public.
4. Notify the Office of Parks, Recreation and Historic Preservation.
5. Determine if State or Federal funding exists in the park.
6. Complete the Parkland Alienation Municipal Information Form.
7. Contact your local State legislative sponsor.
8. Draft legislation with the help of the legislative sponsor and State Parks' Counsel's Office.

A thorough description of these steps can be found at:
http://www.nysparks.state.ny.us/news/public/archive/2005_AlienationHandbook.pdf

[5] Potentially alienated parkland receiving certain categories of state or federal funding must also undergo a parallel process called conversion, which must be signed off on by the National Parks Service before completion. However, it is unlikely that any prospective developers who are looking to deck over the transportation properties being studied in this project will have to deal with the conversion process.

FEDERAL HIGHWAY ADMISTRATION: AIRSPACE GUIDELINES TO 23 CFR 710.405-710.407

A QUESTION AND ANSWER GUIDE FOR AIR RIGHTS DEVELOPMENT

This online interpretive memo, Published on December 21, 1999, answers questions about the federal regulations related to airspace development over highways. The guide is intended for those "who administer lands and property rights acquired as a result of a Federally-funded highway or transportation project under Title 23 U.S.C."

Although the term "airspace lease" is used throughout the memo, the regulations cover all potential air rights leases, no matter what their duration. Legally, "air rights" is a term that applies to all land above *or below* the plane of the transportation facility – that is, the vertical clearance envelope needed by vehicles to pass through a corridor safely.

The central tenet of airspace leasing remains that such a lease can be granted for non-transportation purposes, *"as long as such uses will not interfere with the construction, operation or maintenance of the facility or anticipated future transportation needs. Private or public uses of airspace may occur, but the preservation of the nation's highway capacity is essential."*[6] The regulations do not apply to railroads, walkways or bikeways that intersect with or travel along Federal-highway rights-of-way. However, the memo does apply to land held by a state department of transportation (STD) or a local public agency.

The guide emphasizes that a successful air rights development is the product of coordination among all of the relevant parties; "A good highway airspace agreement must reflect legal, planning, environmental, design, construction, maintenance, and insurance and safety requirements."

Final approval for all airspace leases on the Interstate Highway System rests with the Federal Highway Administration (FHWA). The FHWA is also a "very interested party" where airspace leases are being negotiated on other roads that are part of the National Highway System (which includes all major limited-access highways in New York City). No facility that makes or stores flammable, explosive or otherwise hazardous material is permitted to be built within this airspace.

A state transportation department has the authority to grant airspace leases wherever it has acquired enough legal rights and title to do so.[7] After determining the airspace's fair market value – which is particularly important if the highway has received federal funds – the state transportation department can get fair market revenue for the airspace, and may use that money for transportation purposes. Airspace can also be used for public purposes such as parks, green strips, parking or public/quasi-public uses.

However, market value need not be a factor if the airspace is used for specific purposes. *"If sufficient available airspace exists within the publicly acquired rights-of-way of an Interstate highway, FHWA may authorize a STD to lease such airspace without charge to a publicly owned mass transit authority, or to another public agency for non-proprietary use for social, environmental or economic mitigation purposes."*[8]

Requirements for executing an airspace agreement are very specific. Each agreement must include:

a. Identification of the party responsible for developing and operating the airspace
b. A general statement of the proposed use
c. The proposed design for the use of the space, including any facilities to be constructed.
d. Maps, plans, or sketches to adequately demonstrate the relationship of the proposed project to the highway facility.
e. Provision for vertical and horizontal access for maintenance purposes.

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[6] http://www.fhwa.dot.gov/REALESTATE/airguide.htm , paragraph 1 of introduction

[7] This may have implication in New York City, where ownership and maintenance of the parkway system is fractured and disputed.

[8] http://www.fhwa.dot.gov/REALESTATE/airguide.htm , *"Question 710.405_6: When is it necessary to determine the fair market value of airspace?*

f. Other general requirements as term of use, insurance requirements, design limitations, safety mandates, accessibility, and maintenance as outlined further in this guidance.

A three-dimensional presentation must be prepared detailing use of the airspace, except when the airspace would be used for public transportation, parking, recreation, and similar uses. In those cases, a basic metes and bounds description, along with relevant plans and cross sections will suffice, at the discretion of the state transportation department.[9]

The interpretive memo also recommends additional agreement provisions, such as revoking the airspace arrangement if the space becomes necessary for highway purposes, and allowing access to the space by highway personnel in case they need to inspect or repair the highway.

Several federally mandated design requirements limit development above a highway. Most significant is a limitation prohibiting the development "at any location between two points established 2 feet beyond the two outer edges of the shoulder, [to] extend below a horizontal plane which is at least 16 feet 6 inches above the gradeline of the highway, or the minimum vertical clearance plus 6 inches as approved by the State, except as necessary for columns, foundations or other support structures."[10]

Columns and supports also must stay clear of the travel envelope; the structure itself also cannot impede lines of sight or driver visibility. An evacuation plan for the airspace development must also be created, in the event of an emergency.

Unless approved by the state transportation department and the FHWA, the roadway's alignment and profile cannot be altered. However, if such a modification improves the highway's functioning and maintenance, the state transportation department and the FHWA could approve the project, but no federal money would be contributed to the improvement. An exception to the above funding restriction occurs when, "if the lease improvements of a proposed facility or other interim uses are for public or quasi-public purposes and would assist in integrating the highway into the local environment and enhance other publicly supported programs."[11]

The FHWA restricts the length of highway that can be decked over at any one location, ensuring that natural ventilation of the roadway is provided. This length limitation is determined on a case-by-case basis by the state transportation department. Where mechanical ventilation is provided, exceptions to the length restrictions can be granted.

When airspace over highways is developed, conformity with other federal statutes is also required, such as the Americans with Disabilities Act and Title VI of the Civil Rights Act of 1964. Relevant Federal Railroad Administration and Federal Transit Administration provisions must be adhered to in cases where their involvement would be necessary to gain approvals.

The interpretive memo can be found at http://www.fhwa.dot.gov/REALESTATE/airguide.htm.

[9] Ibid, Question 710.405_9: "What information must be included in an airspace agreement?"

[10] Ibid, Question 710.405_15: "Are there design requirements for leasing of highway airspace?"

[11] Ibid, Question 710.405_19: "What if it is beneficial to change the highway alignment?"

Appendix B: Glossary

air rights: Sometimes termed development rights, these are the real estate rights to develop above a parcel of held land. The empty space above the already owned area can be rented, leased or sold for the purpose of new construction.

corridor: For this report's purposes, this term is used to describe a more or less continuous highway, rail or transit alignment. These consist of pieces of land used for transportation purposes that traverse various areas of the city.

decking/deck construction: The process of creating a surface above an open space that can be used for further construction. By constructing a deck that can support the weight of a new development and/or surface transportation infrastructure, the air rights above the piece of land can be utilized for building.

deck plane: The level at which the deck is constructed. Since subgrade road/rail corridors and surface elevations are often not constant (even within a single parcel), ensuring sufficient vertical clearance for cars, trucks and trains usually controls whether a specific area is deckable. For example, exit ramps between a highway and the surface level often cut into what would otherwise be deckable airspace.

floor area ratio (FAR): The principal bulk regulation controlling the size of buildings. FAR is the ratio of the building's total floor area to the area of its zoning lot. Each zoning district has an FAR control which, when multiplied by the lot area of the zoning lot, produces the maximum amount of floor area allowable in a building on the zoning lot.

grade crossing: The point at which two or more rights-of-way intersect. A grade crossing occurs when the paths are at the same grade and a means to safely allow both crossings to occur must be provided. Most commonly used when referring to an intersection of road and surface railroad

grade separation: A crossing at which two rights of way intersect at different grades. This separation most often occurs when one right-of-way is elevated or depressed into the landscape, allowing traffic on the other to move unimpeded.

limited-access highway: A highway in which access from neighboring properties and streets is in some way limited. This term often refers to parkways or expressways with limited entrances and exits.

open cut: A corridor that utilizes sub-grade construction to function without interfering with other transportation paths. Unlike corridors hidden in tunnels, open cuts have open space over them that may potentially be decked over for future construction.

Parcel: For this report's purposes, a single piece of contiguous airspace that could potentially be used for future developments.

parcel identification code: The alphanumeric system used to identify each specific parcel as examined in this study. Each portion of the identifier is used to classify a specific aspect of the parcel. For example: **K0806**

- "K" represents the borough in which the parcel is located. (B-Bronx, K-Brooklyn, M-Manhattan, Q-Queens, S-Staten Island)

- “08” is the corridor number. Each parcel along the same continuous corridor will share the same letter and first two digits of its identifying sequence. In general, the first two numbers also correspond to the type of transportation corridor in question.
    - 01-29: roads
    - 30-59: transit facilities (50-59: subway yards)
    - 60-89: railroad facilities (80-89: railroad yards)
- “06” is the number specific to the parcel. These numbers tend to increase in value as they radiate outward from the Manhattan CBD and Downtown Brooklyn.

parkland alienation: Much of the green space lining parkways and expressways is under the jurisdiction of the Department of Parks and Recreation. The New York State Legislature decides whether use of the space for non-park uses (i.e. the alienation) is allowed. Replacement of the space usurped, in some form or another, is required before permission is granted to use the land in question.

potentially remappable streets: Roads that could be reinstated after development of the air rights above a specific parcel. These streets are noted if they are unimpeded by buildings, ramps or other obstructions and are good candidates for restoration. These street segments often existed either on paper or in reality prior to construction/grade separation of the transportation corridor.

Primary Land Use Tax Lot Output (PLUTO) was developed by the Department of City Planning as a tool for examining land use and geographic data. DCP’s Information Technology Division (ITD) has compiled various data fields to form this comprehensive resource.

railyard: A series of tracks, usually, contiguous, positioned to allow storage and maintenance or railcars, and access to revenue track.

rezoning is the process of amending the Zoning Resolution for the purpose of altering provisions for development. In doing so, the building standards for a specific area or type of project can be changed and will then affect all future construction. The process of rezoning includes extensive review by affected community boards, borough presidents, the City Planning Commission and the City Council. Only after the proposed amendment goes through this process of approval can it be adopted into the Zoning Resolution for implementation.

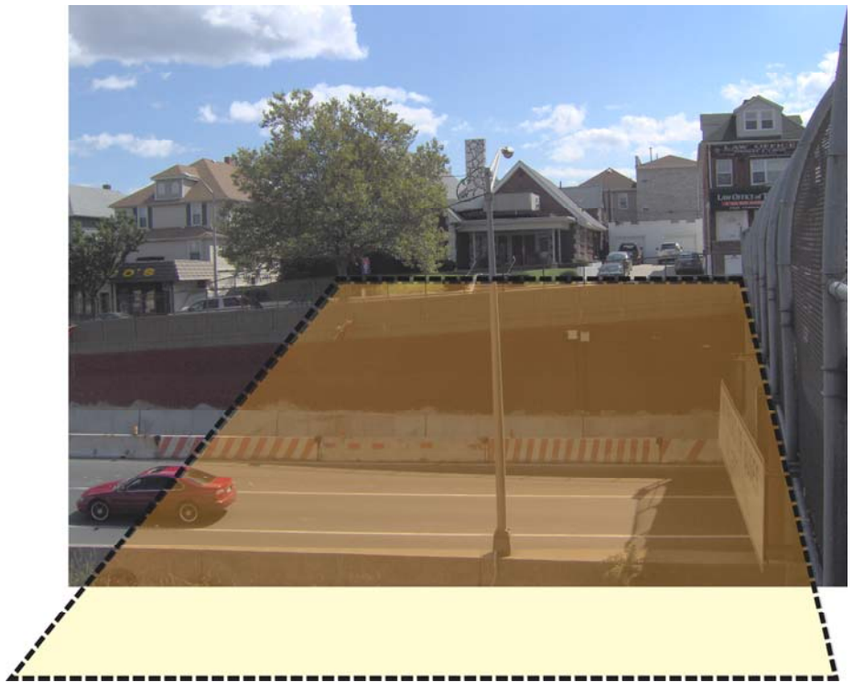
rights-of-way: Pieces of land designated for transportation use by the public or a private transportation authority (i.e. roads, highways, railways or other transit corridors).

subgrade: Generally used in this report to describe a right-of-way far enough below surface level to deck without impinging upon the alignment’s minimum required vertical vehicular clearance.

APPENDIX C: A Brief Illustration of Potential Deck Configurations

The following terminology was used in this study to describe how a deck could potentially fit into the existing landscape.

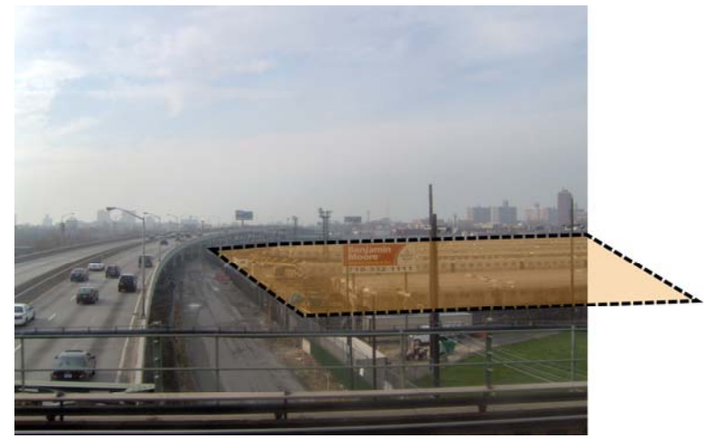
The phrase, **"a deck would be <u>above</u> the surrounding land,"** is meant to illustrate conditions where the variations in topography would cause the land to slope downward below the deck, such as towards the left side of the photo below. A deck in such a location might look like this:

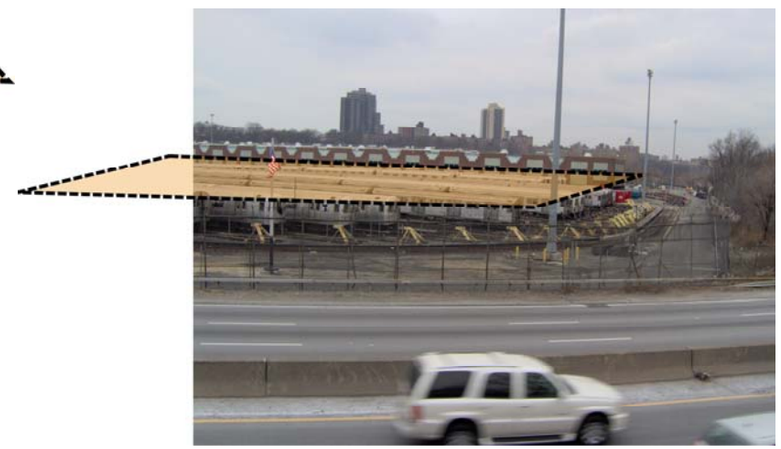


The phrase, **"a deck would be <u>below</u> the surrounding land,"** is meant to illustrate conditions where extreme heights would cause a deck to sit below ground level or places where the variations in topography would cause the land to slope upward above the deck. A deck in such a location might look like this:

The phrase, **"A deck would be <u>canted downward</u> to conform to adjacent topography,"** is meant to illustrate conditions a steep slope would require a slanted deck in order to be flush with the ground at both or all edges of the parcel. A deck in such a location might look like this:

The phrase, **"A deck would be a raised platform relative to open space,"** is a condition typically found at rail yards which are not placed below grade, although it is also found at rights-of-way cut into the sides of hills. In rail yards, the deck would be placed above ground on pilings or pillars and would not be flush with the existing terrain. Additional deck access would need to be built. In hillside conditions, the deck would be flush with the existing ground on one side, but open on the others, much like the FDR Drive is today. A deck in such a location might look like this:





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