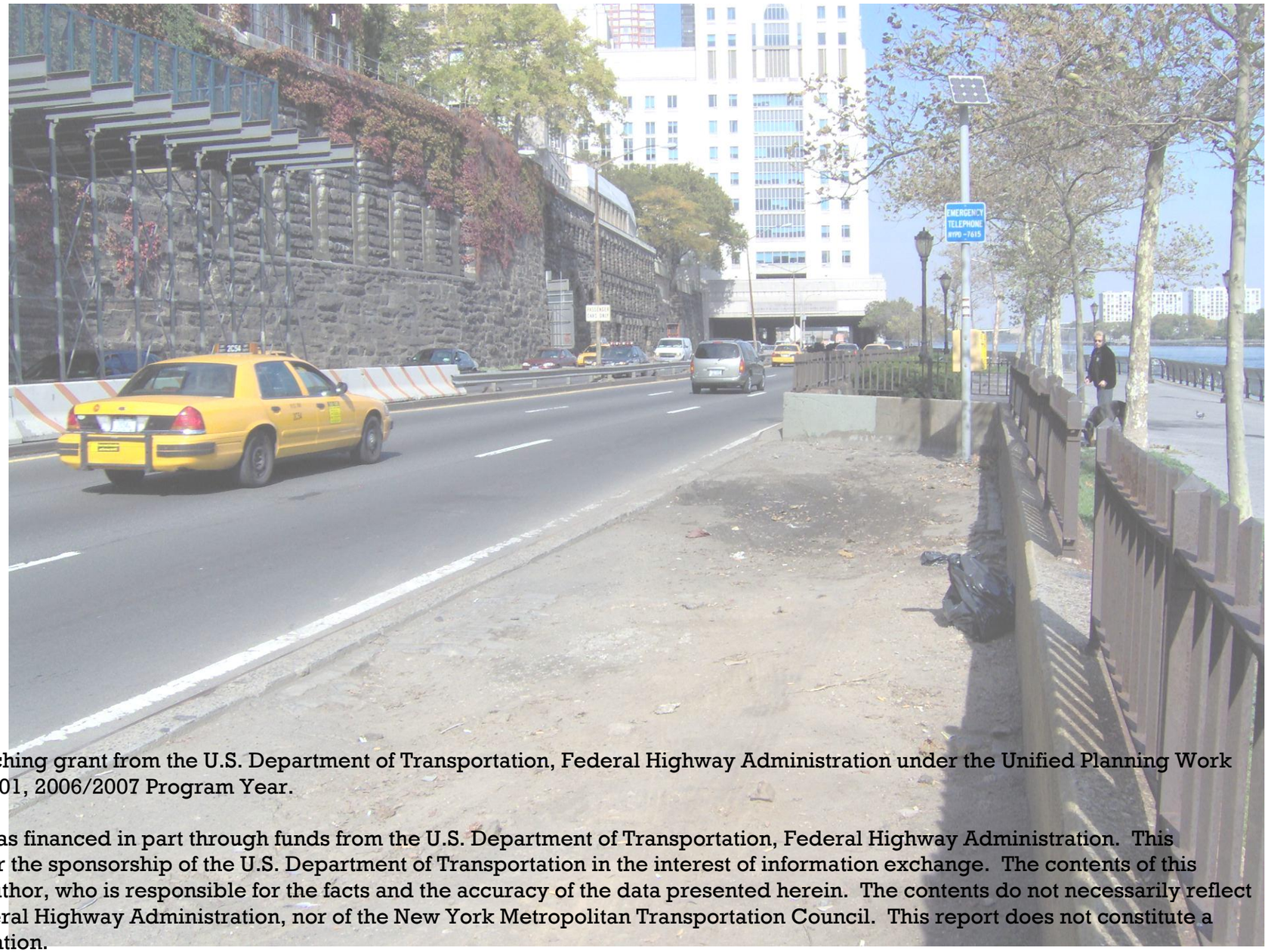
INVENTORY OF DECKING OPPORTUNITIES OVER TRANSPORTATION PROPERTIES

DEPARTMENT OF CITY PLANNING

CITY OF NEW YORK

FINAL REPORT

September 2008



This study was funded by a matching grant from the U.S. Department of Transportation, Federal Highway Administration under the Unified Planning Work Program, NYS PIN# PTCP06F00.01, 2006/2007 Program Year.

The preparation of this report was financed in part through funds from the U.S. Department of Transportation, Federal Highway Administration. This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The contents of this report reflect the views of the author, who is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the views or policies of the Federal Highway Administration, nor of the New York Metropolitan Transportation Council. This report does not constitute a standard, specification or regulation.

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FOREWORD

This report is the final product of the *Inventory of Decking Opportunities over Transportation Properties* project, a study conducted by the New York City Department of City Planning. The purpose of this study is to create a draft inventory of transportation corridors and rail yards in New York City that could accommodate the construction of a deck at surface level.

In April, 2007, Mayor Michael R. Bloomberg, released *PlaNYC*, a sustainability plan that outlined ways to accommodate a projected population growth of nearly one million people by 2030, while improving both infrastructure and environmental conditions. One of the proposals contained in the plan was to "explore opportunities to create new land by constructing decks over transportation infrastructure" in order to create new housing, public open space, and other uses. The plan also describes how undeveloped land over transportation infrastructure offers numerous opportunities to reknit the city's neighborhoods together. In terms of community participation, *PlaNYC* states: "As our search for land becomes more pressing in the coming decades, we must be prepared to work with communities to explore the potential of these sites."

This inventory is a first step towards identifying these potential land resources citywide in order to understand how they might better serve the city. There are 83 transportation infrastructure sites described in this report, comprising nearly 1,000 acres of land, including sites over highways, rail lines and rail yards. Development of any of the sites included in this inventory is likely to be a long-term planning project and so this inventory is designed to be updated and modified as conditions in NYC change over time.

In addition to the opportunities presented by the availability of unused development rights located above transportation infrastructure, the report examines a number of the general constraints associated with the use of such sites to accommodate future population growth. However, this report does not recommend any particular location for land use changes. Instead, it is meant to serve as a resource for future consideration of how these sites might serve the needs of the city's residents.

Any plan for the future use of any of these sites would require extensive site-specific analysis and coordination, including, but not limited to:

- Identification of an appropriate program for site development;
- Identification of appropriate uses for each location, given the site's relationship to the surrounding neighborhood and to transportation networks;
- Building consensus with stakeholders;
- Analyses of soil and subsurface conditions;
- Coordination with the transportation agency with jurisdiction over the right of way, as well as other relevant agencies;
- Design and engineering;
- Cost analyses and securing the necessary financing for the project;
- Obtaining all necessary governmental approvals and conducting a full public review (e.g., CEQR, ULURP); and
- Actual construction of both the deck and the overlying use.

It is hoped that this report and subsequent updates will provide a basis for further investigation into the use of these properties for the benefit of the surrounding communities.

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EXECUTIVE SUMMARY

Introduction
This report is the final product of the *Inventory of Decking Opportunities over Transportation Properties* project, a study conducted by the New York City Department of City Planning's Transportation Division. The purpose of this study is to create an inventory of transportation corridors in New York City that are sufficiently below grade to permit the construction of a deck at surface level. In addition, several of the city's rail yards, most of which are at or above grade, have been included in this study.

"Air rights" are defined as the airspace immediately above (or below) a parcel of land's primary use. For this study, that use is as a transportation corridor (road, transit or long distance/commuter rail).

There are 83 transportation corridors included in this report.

The inventory describes and graphically displays each corridor and yard. The corridors and yards were divided into "parcels" based on existing breaks in topography to provide a more nuanced view of each as a potential site for surface uses. Surrounding zoned densities – measured by a floor-to-area ratio (FAR) – are also included to provide context for an appropriate scale of uses along each corridor.

Any proposal for surface uses within these corridors would have to be examined in light of the specific conditions and context.

Each site is unique in terms of its opportunities and challenges, and future planners and policy-makers can use this as a resource as they examine the feasibility of "decking over" transportation corridors and other properties.

This report can be used by both public-sector policymakers and other decision-makers looking for a comprehensive inventory of potential transportation air rights sites.

This study has two goals:
1. To provide a complete inventory of all potentially usable properties over subgrade transportation corridors and railyards within New York City

2. To provide policymakers and stakeholders with a summary of obstacles and limitations to building upon specific types of sites.

Types of Transportation Corridors Included in This Report
Three different types of transportation facilities were inventoried for this study:

- *Transit and Railroad Open Cuts:*
  - These can be ideal locations for transit-oriented uses, but physical impediments such as midblock locations and lack of room for deck supports can limit some parcels' viability as potential deck sites.

- *Transit and Railroad Yards:*
  - Often exceptionally large, these sites encourage "thinking big." However, many yards are at or near street level, limiting seamless integration with surrounding communities. Sub-deck ventilation is also an issue, especially in the short to medium term.

- *Roadway Open Cuts:*
  - These sites have can have the great potential to reunite communities divided during mid-20th century highway construction, but roadway ventilation and the impact of vehicle emissions upon uses above the roadway pose serious environmental and engineering challenges. Parkland alienation would also be required along some rights-of-way.

The Potential of Air Rights over Transportation Corridors

Air rights over transportation corridors can be used to meet several of the City's needs:

1. Accommodating Population Growth

NYCDCP's Population Division expects the City's population to increase by 1.1 million people between 2000 and 2030, but not uniformly across all neighborhoods. According to NYCDCP's 2006 report, "New York City Population Projections by Age/Sex and Borough 2000-2030," the projected population of 9.1 million in 2030 will be a new population peak for NYC.

Such population growth has policy implications. In rapidly growing areas, transportation alignments that are sufficiently subgrade for decking could be explored as sites for residential or commercial needs, or for siting city services – schools, parks, public health and safety facilities — that must be located in specific neighborhoods

In April of 2007, Mayor Bloomberg unveiled *PlaNYC, A Greener, Greater New York*, a compendium of 127 initiatives created to sustainably provide for the land, water, transportation, energy and air quality needs of the City through 2030. The prospect of decking over transportation properties appears as Housing Initiative 8. "As our search for land becomes more pressing in the coming decades," the report states, "we must be prepared to work with communities to explore the potential of these sites."

2. Reuniting Communities

Many of NYC's highways, transit and rail lines physically divide the communities surrounding them. While some of these corridors are wider and more conspicuous than others, most of them have resulted in reduced connectivity between opposite sides of highways or rail cuts, since not all cross streets were rebuilt (or even built in the first place) once the open cut was built. Decking over such cuts offers opportunities to repair these gaps, improve surface circulation for pedestrians, bicyclists and motorists, and foster more cohesive communities with a better-defined sense of place.

3. Economic Development and Tax Revenue

The airspaces above transportation corridors are an untapped potential source of economic development or revitalization for many communities. Because these highways and rail routes run below grade, many neighborhoods have unused space upon which new surface uses could be created if it is economically or qualitatively desirable. By creating a destination on what is effectively an open parcel of land – whether for housing, businesses, offices, entertainment, cultural institutions, education facilities, or parkland – adjacent blocks can benefit. Surrounding property values can increase. Even if a park or non-revenue-generating use takes up all or part of a deck and doesn't generate revenue on the deck itself, that use might boost the assessed valuations of adjacent blocks and properties while improving the quality of life of adjoining communities.

4. Mode-Appropriate Land Use

In recent years, NYCDCP has emphasized the importance of neighborhood rezonings that are sensitive to the scale and proportion of each existing neighborhood. At the same time, these rezonings have often encouraged higher densities along and adjacent to transit in order to help meet the city's growth projections. Open cuts along rail and highway properties may offer opportunities for transit-oriented development.

5. Flexibility for Public Facility Siting

As the City's population increases, demands for neighborhood-specific city facilities – schools, hospitals, community centers, parks and recreation, police precincts, and firehouses – will grow at the same time that less and less available space exists on which them. The corridors contained in this report provide an inventory of space that could be used to provide these necessary public services.

6. Restoring Street Networks and Improving Transit Access

Many streets that once crossed the alignments described in this report either were not rebuilt over the transportation corridor or never built. This disruption in the surface roadway network warp traffic patterns, stymie bicycle and pedestrian movements, and limit bus service.

This inventory will provide a list at each corridor of surface streets that can potentially be created (or in some cases restored) over corridors. Whether they should be created – or partially reconnected with pedestrian overpasses – is a question that would require more study and discussion at the neighborhood level.

7. Noise and Air Pollution Reductions
Pollution is a constant issue for those who live or work next to road and rail corridors, but the type, consistency and intensity of the pollution varies by mode. Decking can greatly reduce noise levels in the surrounding community, and can channel air pollution into particulate filter traps and ventilation shafts, potentially improving neighborhood quality of life, but mitigation costs and the ultimate disposition of exhaust are crucial issues which would need to be addressed.

8. Service Reliability and Reduced Weather Exposure for Corridor Users
Decking over a road or rail corridor limits exposure of the underlying use to the elements, reducing maintenance costs for road and rail agencies alike. For drivers, these decks can provide respites to driving in severe weather. New York City Transit would also benefit from have more outdoor portions its system enclosed. When severe weather strikes – especially snowstorms – NYCT stores as many vehicles into its tunnels as possible, often halting express service so that trains can be stored on these tracks. Severe weather can also truncate train service in outdoor areas – especially on embankments and open cuts, where snow cannot fall through the open deck of an elevated trestle. Covering over train yards and open cuts could therefore reduce the impact of these major weather events.

Limitations of Air Rights over Transportation Corridors
Several factors – economic, physical and political – may limit the ability to fully realize the potential of air rights over transportation properties. This chapter explores these.

1. Upfront Capital Cost
Decking over a transportation corridor can be very expensive. High upfront costs push up the scale of air rights uses. Constructing a deck, which may include retrofitting the road- or railbed below to create space for support columns, or providing adequate ventilation and lighting for the newly-created tunnel, add expense to such a project. The cost of decking could mean that either public subsidies or high densities would be needed in order to make such a project economically feasible.

2. Ongoing Deck Maintenance Costs
Once the deck is built, it needs to be maintained. While initial maintenance costs would be minimal, they would gradually mount as age and weather take their tolls. Eventually, parts of the deck may need to be replaced entirely – an expensive proposition made moreso by the need to maintain the flow of traffic below.

3. Short-Term Disruptions to Subgrade Road and Rail Operations
Building a deck over the road or rail corridor may require temporary closures or reroutings affecting the highway or rail right-of-way. Traffic may have to be moved to alternate tracks within the same alignment, rerouted to another alignment altogether, or in the case of rail rescheduled to allow uninterrupted access to the deck during off-peak hours. There may be costs to the owner/operator of the transportation corridor for providing the personnel and equipment needed to safely divert or slow down traffic in the construction area.

4. Viability of Supporting Columns in Road/Rail Beds
With the exception of Grand Central Terminal and isolated anomalies like Newkirk Plaza in Brooklyn, most prewar right-of way construction did not set aside space specifically for support columns. At most locations where transportation rights-of-way were created, it was not anticipated that a deck would ever be built.

Retrofitting existing road or rail uses to provide room for deck supports can be a lengthy, costly, disruptive process, especially if the right-of way in that location is too narrow to allow tracks or a road to be moved. If adjacent propertied abut the corridor, widening it to provide support columns might become nearly impossible.

Since many transportation facilities, including the Coney Island Yards, were built on swampland, test borings would be needed to definitively determine how deep and strong any supports must be at individual sites.

5. Ventilation
Any substantial enclosure of an open cut or yard would probably require ventilation. For highways, under free-flowing traffic conditions, combined decks and overpasses can generally be up to 500 feet long before mechanical ventilation is needed, since free-flowing traffic pulls air in and propels it out at shorter lengths. However, no uniform standards exist in the United States pertaining to how long a tunnel must be before ventilation is required, but at locations with chronically congested traffic, the distance required before ventilation is needed may be far shorter than 500 feet, since idling vehicles pollute more while circulating air less.

The closest thing to a consensus on the subject may be a set of standards published by the National Fire Protection Association. *NFPA 502: Standard for Road Tunnels, Bridges and Other Limited Access Highways*, has become the industry standard for tunnel ventilation.. Tunnels more than 90 meters long (or about 295 feet) are required to meet some ventilation, safety and fire safety standards. This report will use the NFPA 90-meter standard, as a threshold for what constitutes a "tunnel." However, each tunnel location is different; there is no "one size fits all" ventilation application.

While basic ventilation (exclusive of fire protection standards) for newly-enclosed subgrade commuter rail or transit alignments could be achieved through standard sidewalk grates, adequate ventilation and noise reduction over vehicular open cuts can be difficult to achieve. The Bridge Apartments, consisting of four 32-story 240-unit apartments which straddle the Trans-Manhattan Expressway in Washington Heights, were built at the same time the expressway opened. The constant noise and exhaust have been problematic for the Bridge Apartments residents. A 2004 New York Times article reported that, "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."[1] The Bridge Apartments vividly demonstrate both the promise and perils of residential development above highways.

6. Parkland Ownership and Alienation

As an inventory, this report is not making recommendations to deck over rights-of-way in mapped parkland. It is important to note, however that much of the green open space alongside the City's expressways and highways, highway medians, and parcels along a smaller number of rail/transit corridors are officially parkland, which must undergo alienation proceedings via the New York State Legislature in order to be turned over to non-park uses. Parkland alienation 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. However, there is generally some latitude in requiring that all three of these criteria for substitute parkland be met. In April 2005, the State Office of Parks, Recreation and Historic Preservation published a revised *Handbook on the Alienation and Conversion of Municipal Parkland*, which explains how to determine whether a park is alienable, and how to bring an alienation from the idea stage to the legislative one.

Further complicating the alienation issue is the fact that a patchwork of entities own and/or maintain most parkway corridors. For example, the Grand Central Parkway roadbed is owned by New York State, but the adjacent green space is owned by NYCDPR. The Belt Parkway is entirely owned by Parks, but NYCDOT is responsible for road maintenance. Any entity which wishes to deck over stretches of subgrade parkway would be confronted with this inconsistent and ambiguous land ownership scenario.

Expressway alignment ownership is simpler. NYSDOT owns and maintains all of the City's expressways, while NYCDPR owns and maintains the surrounding parkland.

Unless a deck were to be built only over the area immediately above the highway and leave the surrounding green space open, at least some parkland would probably have to be alienated. Even if the peripheral parkland were to be regarded in place without destroying its trees and plant life, the question of whether such an act is alienation would need to be addressed.[2] Incorporating substitute parkland into the deck plan could be considered since new surface parkland yields more usable recreational space for surrounding communities. Currently, almost none of the green space in an open cut surrounding one of these roadways is open to the public, either for passive or active recreation, making any public access an improvement.

7. Erratic Topography

Not all roadways, yards, or rail corridors are surrounded by level land. A dramatic example is the FDR Drive on the Upper East Side of Manhattan, where buildings flush with street level on the west are built atop the highway, with the East River immediately to the east.

Federal Highway Airspace Guidelines require a minimum clearance of 16 feet, 6 inches above highway grade, but standards for railroads and transit are less uniform; consultation with owners and operators of those corridors would be needed to determine an acceptable deck ceiling.

[1] Ibid.

[2] DCP Counsel's interpretation of alienation, December 2007.

One or more locations along the deck perimeter must be able to connect with the street level, or close enough to the street level or adjacent properties, for a parcel to be included in this report. If the deck is large enough to accommodate automobiles and does not preclude their use, at least one perimeter location should be both flush with the surface and wide enough to carry at least one traffic lane in each direction. Very large decks – ones that are large enough to provide streets upon – would need vehicular access points at multiple locations along the perimeter, unless vehicles are specifically restricted from the deck. Ramps may be needed to convey vehicles between sizable vertical gaps, but will need to be of a sufficiently gentle grade to allow trucks and buses to easily reach the deck if their presence is anticipated.

8. In-Ground Structures Exceeding Deck Plane

Railyards and transportation corridors often have support structures within their roadbeds, such as substations, utility and catenary lines and supports, storage rooms, maintenance facilities, and light or radio towers. Sometimes these structures are tall enough to rise above the surrounding surface plane. For the potential air rights use, this could cause problems. It may be necessary to replace such facilities or make design adjustments (such as incorporating these facilities into the deck surface plan) in order to make deck construction possible where in-ground structures exceed the deck plane.

9. Security and Emergency Exits

Ensuring adequate security features and emergency evacuation egresses must also be considered in deck creation. Evacuations and traffic diversions will be easier in an open cut than in a tunnel, and security issues will likely be less complicated in an open trench. Retrofitting of the cut to provide emergency entrance and exit points is crucial, and may significantly contribute to garnering legislative or fiduciary support for a decking project.

Additional Factors

1. Expense and Risk

Decking to create land is a high cost and high risk venture. Current research indicates that construction costs for decks range nationally from $300/sf to $700/sf. In addition to the costs of deck construction, air-rights acquisition and building construction costs must be added, affecting the number, shape and size of sites in New York City where decking may prove to be practical.

Some degree of government subsidy (tax breaks, land write-downs, reduced air rights prices, bonus FAR or other subsidies) may be necessary for the creation of decks over the City's transportation corridors and yards to be financially viable in many locations.

2. External Factors

All sites within the inventory could be affected by one or more of the following external factors, related to the particular location of a transportation property with air rights:

a. Current and/or surrounding zoning. Buildings constructed over transportation rights-of-way are often large and tall in order to minimize the cost of footings and decking and to provide sufficient revenue to justify the investment required. However, proposals for such structures need to be evaluated in the context of the communities in which they would be built. All such buildings need not be "contextual" but would have to be carefully studied and evaluated for its appropriateness at its specific location.

b. Proximity to subway or other high-volume public transit system. Locating new air rights uses close to mass transit provides the opportunity to encourage access to the site that does not depend on cars, thus reducing congestion and pollution. This is in keeping with the City's 2030 housing and environmental goals.

c. Impact on existing green open space or parkland. Maintaining and increasing green open space is an important component of PlaNYC and New York City's future development and sustainability goals, but some rights-of-way sit nestled at the bottom of sloped and often wooded embankments. These cuts may present problems because, while wooded embankments and parkland alongside rights-of-way are not usable as active parkland, such spaces do constitute part of the limited stock of parkland. In some cases, especially along vehicular rights-of-way like parkways, alienation of parkland may also be necessary. Alienation requires approval of the State Legislature and is required even if the parkland is not accessible to the public.

d. Effect upon abutting properties. The potential for decking over transportation rights-of-way needs to be evaluated in the context of how the land uses upon such decks would affect adjoining properties. Such land uses could enhance the vitality of an area but could also raise issues of congestion or access to light and air.

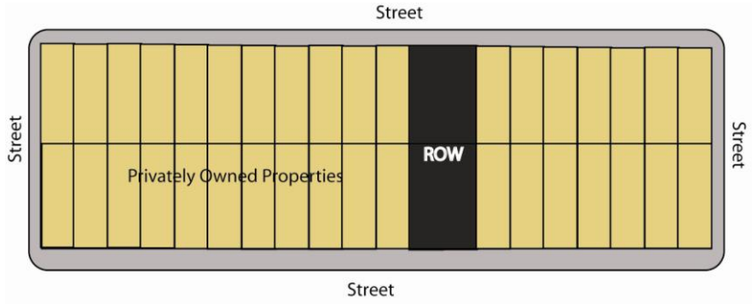


Figure E-1 A right-of-way cut laterally through a block.

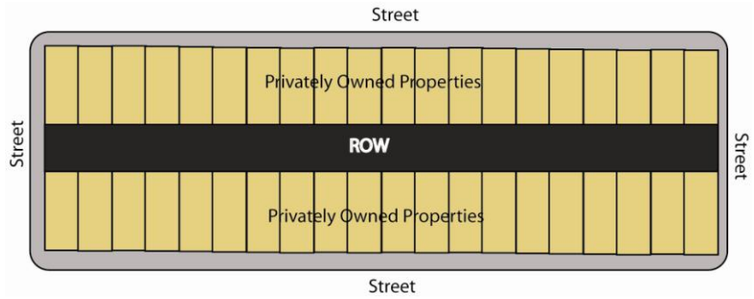


Figure E-2: A right-of-way running lengthwise through the middle of a block.

e. Sufficient access to and from the surrounding areas. While most rights-of-way that run in, or directly next to, existing streets have ample access points, those that run through blocks often raise problems. For example, in Brooklyn, many rail right-of-ways run lengthwise through the middle of residential blocks (see Figure E-2 above), as opposed to laterally (Figure E-1). Access to the transportation right-of-way, except at the end of each block, would be severely limited. Decking and construction above the end parcels might be feasible and possibly desirable in areas with commercial overlays, but interior development would most likely not.

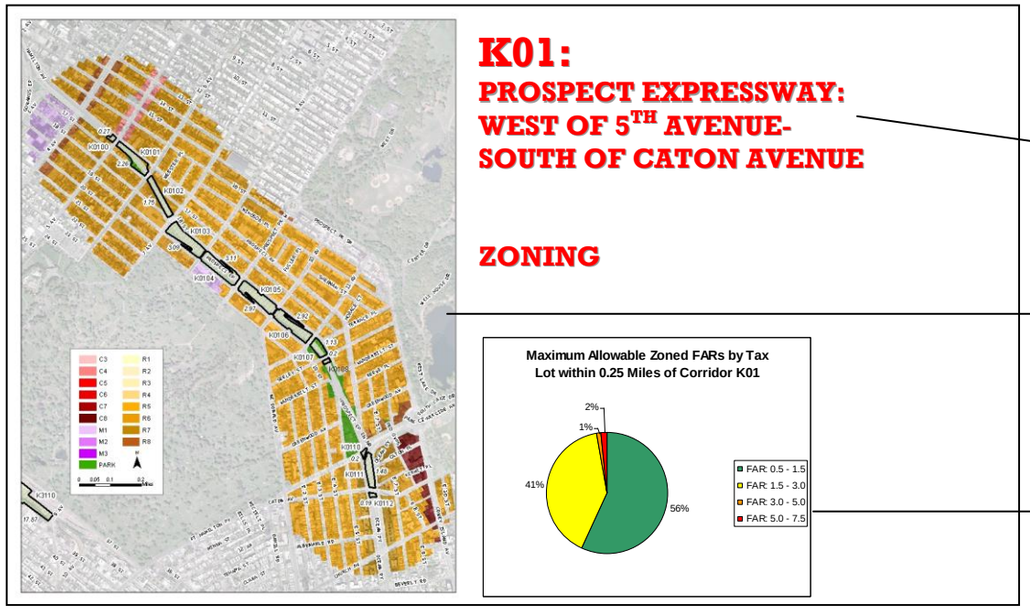
Additional access problems may occur when the parcel(s) in question are at or above grade – a situation that arises with some subway and rail yards throughout the City. While decking over these yards may be viable, it would be wholly or partly on a raised deck, meaning that any access to the parcel itself would have to come via stairways, elevators, or ramps to and from street level.

Structure of This Document and Intended Uses of This Inventory

This document consists of three parts. Part I (Chapters 1-5) provides a detailed description of the inventory's methodology, historical context, and the opportunities and constraints associated with decking over transportation properties. Part II (Chapter 6) is the inventory itself, comprised of 83 transportation corridors throughout the City that could conceivably have their airspace decked over. Part III contains the Literature Review, which describes examples of transportation corridor decking in NYC and other cities. Part III also includes a glossary, illustrations of potential deck configurations, and acknowledgements.

The inventory is meant to be a resource for land use planners that can be updated and modified as conditions in NYC change over time. The descriptions of opportunities and constraints are meant to inform decision makers of general issues surrounding decking over specific transportation corridors. Any particular site being considered for development would require an in-depth, site-specific analysis of geological conditions, surrounding land uses, transportation impacts and community and environmental issues that are not covered in this report.

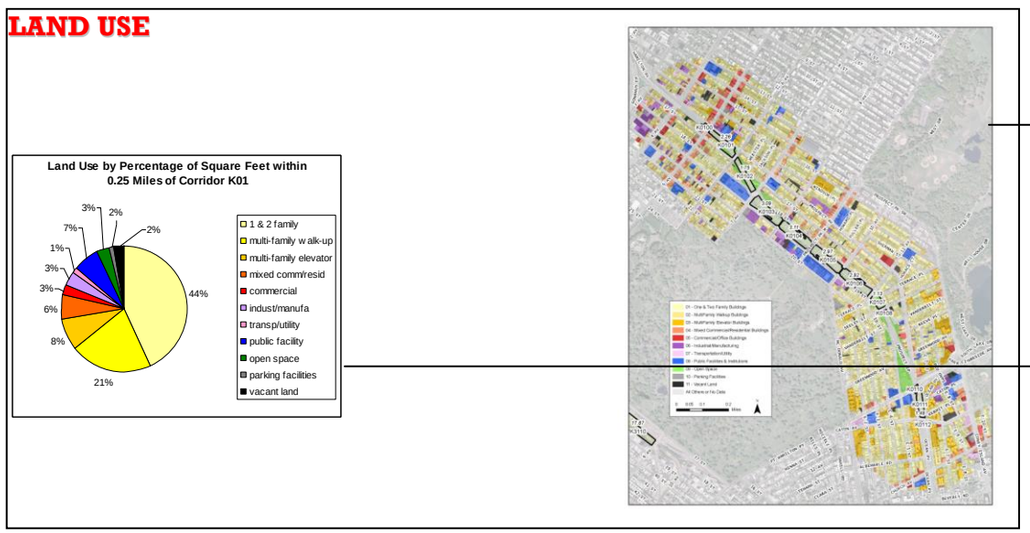
Corridor Descriptions: A User's Guide



Parcel corridor number and route description

Zoning map of all lots within ¼ mile of corridor parcels

Pie chart showing maximum allowable zoned FAR by tax lot within ¼ mile of corridor



Land use map of all lots within ¼ mile of corridor parcels

Pie chart showing percentage of land use by type within ¼ mile of corridor

GENERAL INFORMATION:

DESCRIPTION

This corridor sits atop New York State Route 27, known here as the Prospect Expressway. The expressway passes through what is increasingly coming to be known as "the South Slope," followed to the southeast by Windsor Terrace and the northern edge of Kensington. From west of 5th Avenue to south of Seeley Street, the expressway is in a trench for just over one mile – one of the longer continuous subgrade highway segments in the City.

OWNERSHIP

DCP's Primary Land Use Tax Lot Output (PLUTO) database indicates that the Department of Parks and Recreation has partial or complete ownership of the parcels along this corridor. In addition, although this corridor is part of the City's expressway system, vegetation and/or Parks property abuts the roadway at parcels K0100, K0101, K0103, K0104, K0105, K0106, K0107, K0110 and K0111. Therefore, any attempt to deck over these locations would likely require parkland alienation. Parts of parcels K0103 and K0104 also appear to have been landscaped.

Parkland exists immediately adjacent to both sides of parcel K0102 at surface level, but none was evident within the expressway trench itself. A deck here would have to take into consideration these surrounding park properties, especially if there is a desire to remap 17th Street through the deck.

Parcels K0100, K0101 and K0102 abut private property. Aside from the political difficulties of building a platform through such a corridor, legal protections requiring sufficient light and air to reach these adjacent properties may exist.

TOPOGRAPHY

Due to variations in the surrounding topography, it appears that a deck would be above the surrounding land at the following locations:

- K0110: The deck would have the appearance of a raised platform relative to part of a pedestrian underpass within adjacent parkland.

VENTILATION

A full deck over the roadway at the following parcels of combinations of parcels would exceed 295 feet in length. A mechanical ventilation system and emergency facilities for the highway below would be needed if these parcels were to be entirely enclosed by a deck. Locations with a long history of slow-moving traffic may need mechanical facilities or emergency ventilation at shorter intervals than 295 feet. Approximate maximum lengths for each parcel are listed below:

K0100: 160 feet	K0101: 870 feet	K0102: 950 feet	K0103: 870 feet
K0104: 830 feet	K0105: 830 feet	K0106: 820 feet	K0107: 440 feet
K0108: 140 feet			

(Existing overpasses are factored into this calculation. All overpasses are counted for each parcel adjoining them, meaning that several overpasses are counted more than once. The combined total of these figures does NOT equal the total corridor length.)

General description of corridor, plus information about corridor ownership, topography and ventilation

Parcel-by-parcel breakdown of adjacent streets or rail lines, size (in acres), underlying uses, and surrounding/adjacent zoning

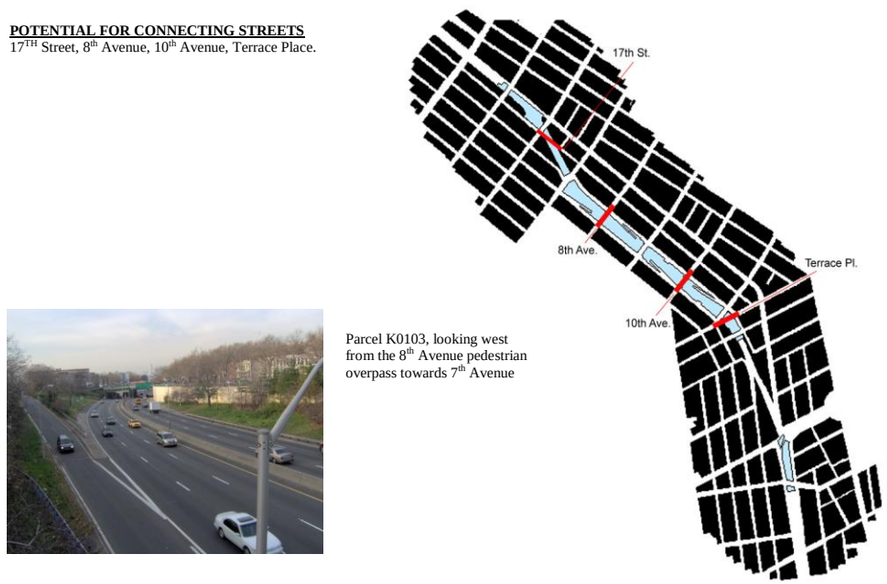
Description and map of potentially connecting streets

PARCEL INFORMATION:

Parcel Code	*Name*	*Size (acres)*	*Existing Corridor Uses*	*Surrounding zoning*
K0100	NY27: W. of 5th Avenue	0.27	NY27 (Prospect Expressway)	C2-4, R6B
K0101	NY27: 5th Avenue-6th Avenue	2.26	NY27 (Prospect Expressway)	C2-4, R6B
K0102	NY27: 6th Avenue-7th Avenue	1.75	NY27 (Prospect Expressway)	R6B
K0103	NY27: 7th Avenue-8th Avenue pedestrian overpass	3.09	NY27 (Prospect Expressway)	R5B (M-1-1 adj)
K0104	NY27: 8th Avenue pedestrian overpass-Prospect Park West	3.11	NY27 (Prospect Expressway)	R5B (C2-4,M-1-1,R5 adj)
K0105	NY27: Prospect Park West-10th Avenue pedestrian overpass	2.97	NY27 (Prospect Expressway)	R5, R5B (C2-4 adj)
K0106	NY27: 10th Avenue pedestrian overpass-11th Avenue	2.92	NY27 (Prospect Expressway)	R5, R5B
K0107	NY27: 11th Avenue-Seeley Street	1.13	NY27 (Prospect Expressway)	R5, R5B
K0108	NY27:S. of Seeley Street	0.20	NY27 (Prospect Expressway)	R5, R5B
K0110	NY27: Fort Hamilton Parkway-expressway entrance	0.20	NY27 (Prospect Expressway)	R6, R7A, R8B, SPD-OP
K0111	NY27: expressway entrance-Caton Avenue	1.48	NY27 (Prospect Expressway)	R7A, SPD-OP
K0112	NY27: S. of Caton Avenue	0.19	NY27 (Prospect Expressway)	R7A, SPD-OP

POTENTIAL FOR CONNECTING STREETS

17TH Street, 8th Avenue, 10th Avenue, Terrace Place.



Parcel K0103, looking west from the 8th Avenue pedestrian overpass towards 7th Avenue

PART ONE: Project Overview and Findings

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The inventory describes and graphically displays each corridor and yard. The corridors and yards were divided into "parcels" based on existing breaks in topography to provide a more nuanced view of each as a potential deck site. Surrounding zoned densities – measured by a floor-to-area ratio (FAR) – are also included to provide context for an appropriate scale of uses along each corridor. Any proposal for land uses within these corridors would have to be examined in light of the specific conditions and context.

"Air rights" are defined as the airspace immediately above (or below) a parcel of land's primary use. For this study, that use is as 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 the road or rail traffic below ranges from around 16 to 24 feet above the roadway surface or base of rail. The airspace *above* this envelope could be available for decking.

This inventory can be used by both public-sector policymakers and other decision-makers looking for a comprehensive inventory of potential transportation air rights.

Each site is unique in terms of its opportunities and challenges, and future public sector policymakers and decisionmakers can use this as a resource as they examine the feasibility of "decking over" transportation corridors and other properties.

1: PROJECT DESCRIPTION

1.1: Goals

This study has two goals:

1. *To provide a complete inventory of all potentially deckable properties over subgrade transportation corridors and railyards within New York City.* For the purposes of this study, "subgrade" means that the right-of-way in question is sufficiently below surface level to permit decking over without impinging upon the alignment's minimum required vertical clearance for vehicles or trains. Conversely, any location that has the potential to be decked over must be virtually flush with the surface-level topography along at least a portion of one of its edges, railyards excepted. The primary goal of this study is to provide both public and private stakeholders with a reference tool that can be used to make informed decisions about deckable sites above transportation corridors. The full summary of potentially deckable parcels can be found in Chapter 6.
2. *To provide policymakers and stakeholders with a summary of obstacles and limitations to building upon specific sites.* These obstacles and limitations include physical conditions such as: existing topography or development which could restrict unfettered access to new land uses upon decks; insufficient room for the placement of deck support columns; or the presence of buildings, power stanchions or other obstacles that might break the surface plane. In addition, political and legal limitations surrounding multiple ownership and jurisdiction, and the requirement that land under Parks Department jurisdiction must undergo State level "alienation" proceedings and remediation for the loss of parkland, are also taken into account. Chapter 4, "Constraints" discusses these factors in more detail.

1.2: Classification by Existing Corridor Use

In general, each corridor can be placed into one of three categories based upon underlying transportation use. While each of these uses presents unique challenges and opportunities, building upon transit and railroad open cuts – particularly those which supply passenger service – best conforms to the goal of sustainable development since building near rail or transit access points reduces the need for automobile dependency.

The three kinds of corridors which appear in this report are:

- **Transit and Railroad Open Cuts:**
  - Ideal locations for transit-oriented land uses.
  - Provide great potential for reuniting communities divided during mid-20th century construction
  - However, some parcels are located midblock, abutting residential backyards.
  - Room may not exist for deck supports within roadbed at all locations within a corridor.

- **Transit and Railroad Yards:**
  - Often large, wide sites which provide the potential for the City to "think big" and plan on a comprehensive scale.
  - Some yards or parts of yards are at or near street level, greatly limiting the ability to seamlessly integrate potential deck uses into the surrounding community.
  - While train and railcar emissions are low and getting lower, some potential decks would need to accommodate diesel-powered maintenance-of-way vehicles, at least in the short- to medium-term future.

- **Roadway Open Cuts:**
  - Provide great potential for reuniting communities divided during mid-20th century construction
  - However, significant environmental issues would accompany decking, from roadway ventilation to impact of vehicle emissions upon uses above the roadway.
  - It is likely that parkland alienation would be required along some expressway and most parkway parcels if decks were to be built across entire rights-of-way.

Table 1: Projected Total New York City Population by Borough, 2000-2030						
	Bronx	*Brooklyn*	*Manhattan*	*Queens*	*Staten I.*	***TOTAL***
2000	1,332,650	2,465,325	1,537,195	2,229,379	443,728	**8,008,278**
'00-'10 growth	68,544	101,510	125,506	50,295	48,080	**393,935**
'00-'10 % change	5.1	4.1	8.2	2.3	10.8	**4.9**
2010	1,401,194	2,566,836	1,662,701	2,279,674	491,808	**8,402,213**
'10-'20 growth	19,083	61,375	66,829	117,275	25,789	**290,351**
'10-'20 % change	1.4	2.4	4.0	5.1	5.2	**3.5**
2020	1,420,277	2,628,211	1,729,530	2,396,949	517,597	**8,692,564**
'20-'30 growth	36,762	90,756	97,017	168,403	34,309	**427,247**
'20-'30 % change	2.6	3.5	5.6	7.0	6.6	**4.9**
2030	1,457,039	2,718,967	1,826,547	2,565,352	551,906	**9,119,811**
'00-30 change	124,389	253,641	289,352	335,973	108,178	**1,111,533**
'00-'30 % growth	9.3	10.3	18.8	15.1	24.4	**13.9**

1.3: Population Growth

The rapidly changing population and demography of New York City's neighborhoods makes careful consideration of all sites essential.

NYCDCP's Population Division expects the City's population to increase by 1.1 million people between 2000 and 2030, but not uniformly across all neighborhoods. According to NYCDCP's 2006 report, "New York City Population Projections by Age/Sex and Borough 2000-2030," the projected population of 9.1 million in 2030 will be a new population peak for NYC.

Such population growth has policy implications. In rapidly growing areas, or in areas where growth is desirable, transportation alignments that are sufficiently subgrade for decking could be explored as sites for additional residential and commercial needs. Decks could also be used for siting city services – schools, parks, public health and safety facilities — that must be located in specific neighborhoods.

1.4: Factors Not Considered and Opportunities for Further Study

Several elements concerning uses or dispositions of the parcels are beyond the scope of this study. What follows is a short list what this study does not set out to achieve:

- It does not recommend specific development or land use policies.
- It does not negate the potential for any site to be decked over.
- It does not assume radical alterations in surrounding topography for the purposes of making all or part of a deck flush with adjacent land.
- It does not presume what surrounding communities want or need. While a basic assumption of this report is that these alignments often have divided the communities surrounding them, planning for any of these sites would need the participation of the adjoining communities.

2: METHODOLOGY

2.1: Development of Work Program

The framework for accomplishing this project's aims included refining the study's goals and parameters; creating a uniform set of elements – such as size, existing use, surrounding land use, and others – by which each parcel would be measured; determining the limits of the literature and data search; developing a site inventory; and synthesizing the data into the final document.

2.2: Initial Scoping and Identification of Potential Sites

An initial "first cut" of potential sites was assembled based upon a combination of aerial photos and knowledge of several of the potential sites. Aerial images of the entire city were then analyzed to identify features such as a preponderance of overpasses along a specific section of road or railway. Field visits were then conducted to determine the viability of all potential sites for airspace decking.

2.3: Literature and Data Review

In an effort to acquire a broader knowledge base about the air rights land use process over transportation corridors, a Literature Review was undertaken, and completed in February 2007. The review was split into three chapters:

1. "Examples in New York City" reviews case studies of previous decking efforts within the City.
2. "Examples from Other Cities in the United States" reviews previous decking efforts that have occurs outside New York City but within the United States.
3. "General Principles and Technical Aspects" provides a broad overview of the theory and engineering behind building a deck over a transportation corridor, along with public policy considerations.

The Literature Review is included as Appendix A of this Final Report.

2.4: Development of Site Identification System

This study employs an alphanumeric five-digit identifier for each parcel. The following site number provides an example:

Q0712

"Q" stands for the parcel's borough. (B=Bronx, K=Brooklyn, M=Manhattan, Q=Queens, S=Staten Island).

"07" is the corridor number. All parcels that fall within a relatively continuous stretch of the same highway, rail or transit corridor are identified with the same corridor number.[3]

"12" is the parcel number. Parcel numbers start with "00" and generally increase as the corridor radiates outward from the central business district. Often a discontinuity – such as undeckable land in the middle of a corridor, or land that has already been decked over – result in some parcel numbers being skipped over. Diverging routes within a corridor also have parcel numbers grouped together.

This study does not use block and lot numbers to identify the parcels analyzed in this inventory because not all parcels are coterminous with blocks and lots, some straddle two or more lots, some do not cover an entire lot, and other parcels have never been assigned an official tax lot number.

2.5: Field Work

Between August 2006 and February 2007 (with additional work in June 2007), every site described in this report was visited. Notes were taken about each parcel, and 501 out of the 511 parcels contained in this report were photographed. This field work provided a qualitative, on-the-ground assessment of existing conditions surrounding each parcel. Some sites, which seemed viable from existing aerial photography, were eliminated from the inventory upon field work inspections; conversely, field work site inspections also revealed deckable properties which aerial views did not.

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[3] Rail yards also have distinct numbers. For quick reference, the corridor numbers are grouped by use:

01-29: roads
30-59: transit facilities (50-59: subway yards)
60-89: railroad facilities (80-89: railroad yards)

2.6: Synthesis

The final set of parcels was then mapped, and the field notes for each parcel written up. Chapter 6, which makes up the bulk of this report, provides a full inventory of each corridor. Using GIS software, the zoning designations located within ¼ mile of each parcel within a corridor were then mapped. Data summarizing this zoning information was tabulated, as well as information about the density of permissible development surrounding the corridors.

3: OPPORTUNITIES

3.1: Historical Framework

Between approximately 1835 and 1975, the present-day City of New York was crisscrossed with numerous major transportation arteries designed to convey people rapidly over great distances. Starting around 1835 with the Long Island Rail Road and the New York and Harlem (later the New York Central) Railroad, construction began on today's commuter and long-distance rail networks. Although largely complete by 1917[4], modifications and improvements to these rights-of-way continued for decades afterward.

Between 1862 and 1879, steam excursion railroads – especially those in Kings County – were built mostly at ground level.[5] However, by the early 1900s increasing urbanization compelled the New York State Legislature to set up the Brooklyn Grade Crossing Elimination Commission to either elevate or entrench rail lines in Brooklyn and Queens.[6] Most of their work was completed between 1904 and 1920; these routes now make up all or part of NYCT's Brighton, Canarsie, Culver, Sea Beach and West End subway lines.[7] Similarly, today's MTA Staten Island Railway can trace its roots to 1860; piecemeal grade crossing eliminations up through the late 1960s gradually made the SIR's sole remaining active route entirely grade-separated. Lastly, an additional railroad – the New York, Westchester and Boston – operated between 1912 and 1937 in the Bronx and Westchester; in 1941 the Bronx portion was rechristened the Dyre Avenue Line and became part of the subway system. It is also grade separated.

Plaque commemorating the 1904-1908 Brighton Line grade crossing elimination project, Newkirk Avenue stationhouse

Most of these commuter rail and transit routes were laid out through what was then farmland, but as more and more adjacent properties were developed, grade crossings were eliminated by elevating, depressing, or placing the existing railroads in tunnels.

For railroads, the grade crossing eliminations resulted in improved operations, since more frequent train service could now be run without effectively shutting down cross streets for most of the day. The depressed rights-of-way undoubtedly improved vehicle and pedestrian safety at ground level, but also created swaths of land which were no longer developable. However, since much open land surrounded many of these rail lines well into the 20th century, this may not have been a major concern at the time.

The newer sections of the subway system, mostly opened or converted to transit use between 1932 and 1958, avoided the issues of grade crossings from the outset. Lines not retrofitted from existing surface or elevated lines were largely built in tunnels or

[4] Major reconstructions of commuter rail segments such as the LIRR Atlantic Division occurred into the 1940s, and stand-alone projects such as the just-completed Jamaica station rehabilitation still occur today. However, completion of what is now Amtrak's Hell Gate Line in 1916-1917 more or less marked the end of new commuter and long-distance rail right-of-way acquisition in the City until the LIRR East Side Access Project, which is now under construction.

[5] Joseph Cunningham and Leonard DeHart, *A History of the New York City Subway System, Part II: Rapid Transit in Brooklyn*, 1977; pp. 9-10

[6] http://www.dot.state.ny.us/fedd/gradex.html

[7] One grade crossing on today's L (Canarsie) Line managed to survive until 1973, and a grade crossing survives today immediately west of the LIRR Port Washington Branch's Little Neck station.

on viaducts; and no new revenue track was laid which had a grade crossing. Several large subway storage and maintenance yards were also built throughout Brooklyn, Queens, Manhattan and the Bronx. While most of these are at grade, untapped potential above their lands still exists at many of these yards.

By the time the City's era of limited-access highway building was in full swing – a period roughly between 1934 and 1975 – New York City was far more developed than it had been during the previous eras of major transportation artery construction. Most of the highway building of the period was under the aegis of Robert Moses, and despite some novel approaches to circumventing private property (such as the three-tiered Brooklyn-Queens Expressway/Brooklyn Heights Promenade), thousands of residents and businesses were displaced as new highways were built at, above or below grade through existing heavily-populated neighborhoods.[8] This had a profound impact on affected communities and the City as a whole. Many communities arguably benefited from improved vehicular access, but at the costs of physically divided neighborhoods and reduced surface travel flexibility, since not every road that had originally traversed a new highway's right-of-way was rebuilt. Additionally, unlike railroads and subways, the noise coming from a highway was constant, as was the pollution.

Whether it be road, long-distance rail or transit, eliminating grade crossings means one of three things: placing of the right-of-way in a tunnel, depressing it into a subgrade open cut, or elevation. Since open cuts provide the greatest untapped potential for returning viable uses to the street level and restoring coherency and unity to a torn City fabric, this study will primarily concern itself with creating an inventory of parcels located above these open cuts, to see what can be decked over and built upon. Additionally, this study will inventory all existing rail yards over which decking can occur, whether they are below, at or above grade. An exception to the subgrade transportation corridor rule was made for rail yards because of their large size and unused air rights.

New York City has several reasons to compile such an inventory, described below.

[8] Over 30 years after its publication, the definitive account of this story remains Robert Caro's *The Power Broker* (1974), particularly the chapters "The Meat Ax" and "One Mile"

3.2: Accommodating Future Populations

The 2000 Census found that New York City's population had for the first time surpassed 8 million, and the 2006 Census Bureau population estimate for the City is 8,250,567.[9]

Projections by the both Department of City Planning's Population Division and the New York Metropolitan Transportation Council estimate a population of over 9 million by 2030.[10] DCP's numerous contextual neighborhood zoning changes over the past several years have sought to balance growth with preserving neighborhood character, thus limiting potential development (and overdevelopment) in established neighborhoods.

New York City has sufficient capacity to accommodate growth through 2030. However, as property is adapted for higher-density uses and remaining available land becomes more scarce, it will be necessary to replenish the supply of buildable sites to moderate the upward pressure on land prices.

New York City has recently attempted to address these long-term issues in a thorough, comprehensive way. In April of 2007, Mayor Bloomberg unveiled *PlaNYC, A Greener, Greater New York*, a compendium of 127 initiatives created to sustainably provide for the land, water, transportation, energy and air quality needs of the City through 2030. Of the 12 initiatives specifically addressing housing, four of them coincide or overlap with what decking can accomplish. Initiative 1 is to pursue transit-oriented development, Initiative 4 seeks to expand co-locations with other government agencies, and Initiative 6 seeks to develop underused areas to knit neighborhoods together.[11]

Decking, however, is the focus of Initiative 8, decking over railyards, rail lines and highways. Besides mentioning Hudson Yards, PlaNYC mentions Sunnyside Yards (corridor Q80 in this report), the Staten Island Ferry terminal at St. George (S01), the railyards at the southern edge of Green-Wood Cemetery in Brooklyn (K31), the BQE "Hicks Street Cut" (K03), and the Gowanus Expressway in Bay Ridge (K02) as

[9] This figure is over 36,000 people more than the original U.S. Census Bureau estimate, but was successfully challenged by the City using DCP estimates. See http://nyc.gov/html/dcp/pdf/census/detailed_narrative_2006.pdf

[10] NYCDCP projects a 2030 population of over 9,119,000.

[11] *PlaNYC: A Greener, Greater New York*. The City of New York, 2007, pp.20-25

among numerous potential candidates for decking. "As our search for land becomes more pressing in the coming decades," the report states, "we must be prepared to work with communities to explore the potential of these sites."

This *Inventory of Decking Opportunities over Transportation Properties* is intended to provide public- and private-sector entities with specific sites where those questions can be answered. As the following chapters show, nearly 1,000 acres of deckable land lie above transportation corridors in the city – the equivalent of about two Prospect Parks, or approximately the size of Central Park and Fort Washington Park put together.

3.3: Reuniting Communities

When many of the rail and transit lines were first built beyond today's central business district, they often did not divide surrounding neighborhoods because those neighborhoods were a) not there yet, b) were still relatively isolated, self-contained villages in essence if not in fact (and remained so well after their absorption into Greater New York), or c) were urbanizing but still had much remaining undeveloped land. Many of these corridors have *become* physical barriers dividing neighborhoods, even if the rail and transit lines were there first.

However, no such ambiguity exists for many of the City's limited-access highways. The Cross Bronx, Bruckner, Long Island, Van Wyck, Brooklyn-Queens, and Prospect expressways were all built at least in part through long-established neighborhoods, and have generally cut through wider swaths of previously developed land than their rail counterparts had. Even some of the City's parkway system, which is generally older than the expressways, was built only after displacing numerous blocks full of developed properties.

At present, most of the people that were initially affected by these displacements have likely either moved or passed away, but the long-term effects linger:

- The creation of physical barriers between otherwise adjacent neighborhoods and blocks.
    - The footprint of highways tends to be wider than that of rail and transit lines, although there are several exceptions to this (such as the LIRR Main Line). For example, the four-track N (Sea Beach) Line from New Utrecht Avenue to Avenue S in Brooklyn is approximately 60 to 65 feet wide. In contrast, the Van Wyck Expressway consumes multiple 180- to 270-foot-wide city blocks from Jamaica to the Belt Parkway.[12] Such outlays of space can be found all over the City. While surrounding highways with grass and trees as a buffer may be desirable in its own right, it was done at the expense of condemning wide swaths of real property and exacerbating physical barriers between surrounding blocks and communities.
- Decreased road connectivity
    - Section 3.7 goes into more detail about the impact of open-cut rights-of-way on cross streets, but it bears mentioning here that, in general, surface circulation is disrupted by severing intersecting roads and failing to build overpasses.
- Creation of "non-places"[13]
    - A rail line or highway in an open cut is not a destination. It is an empty space to get past. For most surface users crossing an overpass or paralleling an open cut via bicycle or on foot, there is no reason to stop and linger. These gaps often carry the perception of being public safety risks, since pedestrians may feel especially trapped and vulnerable at such locations. The photo on the following page conveys the absence of life at such locations, and the anonymous impromptu garbage dumping which often occurs along them.
- Increased air and noise pollution
    - Section 3.8 will discuss noise and air pollution. Both are factors to those living near open-cut transportation corridors and rail yards, but air pollution is an especially major concern for those living near limited-access highways.

Finally, and most difficult to quantify, may be a perception that a highway open cut, and to a lesser degree a rail cut, is the result of value judgments that once weighed neighborhood continuity against the need to move traffic and found highways a more urgent priority. Decades after those decisions were made, some neighborhoods

[12] In contrast to the Van Wyck, the Brooklyn-Queens Expressway Hicks Street Corridor – which is about as space-efficient an arrangement as a highway can get – is 75 feet wide.

[13] There is a considerable body of literature on "place-making" and the importance of "place" in the urban planning literature. The New York-based Project for Public Spaces (http://www.pps.org) is one such resource.

remain cut off. By actively seeking to close gaps where they can be closed, the City could reestablish internal continuities in neighborhoods where open cuts are problematic.

Garbage on the south sidewalk of 38th Street, north of Parcel K3101 in Brooklyn. An abandoned shopping cart is in the distance.

3.4: Economic Development and Tax Revenue

Ignoring the airspace above transportation open cuts also has a very concrete, quantitative impact upon New York City's economic climate.

These airspaces are an untapped potential source of economic development or revitalization for many communities. Because these highways and rail routes run below grade, many neighborhoods have unused space upon which new decking could take place if it is economically or qualitatively desirable.

If the effects of highway construction can ripple out into surrounding blocks, so can reuse of these highway rights-of-way. By creating an appropriate destination on what is effectively an open parcel of land – whether for housing, businesses, offices, entertainment, cultural institutions, education facilities, or parkland – adjacent blocks can benefit. Surrounding property values can increase. Businesses could benefit from additional customers. Commercial districts could grow or, in cases where they are interrupted by a vacant overpass, be united and made more cohesive.

New housing, businesses, or cultural facilities may make a surrounding neighborhood more desirable. Improved transit access above rail properties, such as new station entrances or bus bays, may also have a positive impact on surrounding taxable lands by making them easier to get to. Even if a park or non-revenue-generating use takes up all or part of a deck and doesn't generate revenue on the deck itself, that use might boost the quality of life and valuations of adjacent blocks and properties.

3.5: Mode-Appropriate Land Use

When the railroads and subway lines were built, high-density land uses usually (but not always) followed in their wake. One only needs to ride the 7 (Flushing) Line in or an E, F, G, R or V train along Queens Boulevard to see this; most of the land which these routes pass through was undeveloped before these subway lines opened.[14] Similarly, any trip on a NYC limited-access highway that was built through undeveloped land will show just how prevalent lower density uses often are around these roadways. High-volume transit corridors and high-density development have a symbiotic relationship – each one needs the other to thrive.

While "Terminal City" north of Grand Central Terminal is a prime example of decking over a railyard, New York City also has visible examples of decks over below-grade highways, most conspicuously over the FDR Drive and the Trans-Manhattan Expressway (I-95 in Washington Heights). Like rail corridors, highways present the same physical obstacles as far as support column space. Unlike rail, creation of the kind of low-density structures which highways can encourage in many areas does not tend to justify the cost and effort of building a deck. Nonetheless, this inventory provides a guide to all known subgrade highway parcels. In low-density neighborhoods where out-of-scale land uses may not be appropriate, there might be

[14] The Fairchild Aerial Surveys from 1924 commissioned by the City's Board of Estimate clearly show the beginnings of development in Sunnyside along the 7 (Flushing) Line, and significant swaths of farmland and forest along Queens Boulevard in Woodhaven, Rego Park and Briarwood, which would not see subway service until 1936.

Table 2: Decennial U.S. Census Population Counts, 1930-2000, and Annual Census Bureau Population Estimates, 2000-2006; plus Persons/Acre		
Year	*Population*	*Average Persons/Acre*
1930	6,930,446	33.65
1940	7,454,995	36.20
1950	7,891,957	38.32
1960	7,781,984	37.79
1970	7,894,862	38.33
1980	7,071,639	34.34
1990	7,322,564	35.55
2000	8,008,278	38.88
2001	8,075,586	39.21
2002	8,107,428	39.37
2003	8,129,996	39.48
2004	8,164,706	39.64
2005	8,213,839	39.88
2006	8,250,567	40.06

other, non-market forces which would encourage a private or public entity to consider decking.

3.6: Flexibility for Public Facility Siting

Increased population also means increased demands for neighborhood-specific city services – schools, hospitals, community centers, parks and recreation, police precincts, firehouses.

Table 2 shows United States decennial Census counts for 1930 through 2000, and annual population estimates since 2000.

As the City's population continues to swell, public facilities face increased strain in two ways: more people are using them, and available space to build new facilities becomes harder to find. As mentioned earlier in this report, NYCDCP estimates that the City will have a population of 9,119,811 by 2030.

As overall population grows, each neighborhood will be confronted with its own issues. Some areas may experience rapid population growth and the need for additional schools. Others may have a dearth of parks and open space. Still others may have the need for new, expanded police precinct buildings or firehouses to replace older, outdated ones. Land above the transportation corridors in this inventory may be able to accommodate some of those needs.[15]

3.7: Restoring Street Networks and Improving Transit Access

The City of New York and Kings County both developed comprehensive street grid plans covering virtually their entire jurisdictions in the 1800s; plans for the Bronx, Queens and Staten Island evolved piecemeal throughout the 19th and early 20th centuries. Each era of transportation has had its own impact on these surface street systems.

Railroads, initially largely built at surface level, stimulated street openings by providing surrounding properties with rapid, frequent transportation. As development accelerated and grade crossings came to be seen as more of a hazard, these rail/subway lines were either depressed or elevated. In some cases, previously existing cross streets were not rebuilt over or under these rights-of-way, thus permanently forcing pedestrians, bicyclists, horse-drawn traffic, cars, trolleys and the few existing buses onto parallel streets which were rebuilt through the alignment. In a few cases, pedestrian overpasses were built, partially mitigating this loss.[16]

As automobile ownership increased throughout the 20th century, the impacts of these street grid interruptions grew. While residents on truncated or dead-end streets may have appreciated the relative serenity of their blocks as car traffic on thru-streets increased, streets which bridged an open cut saw increases in traffic as vehicles were funneled onto these overpasses.

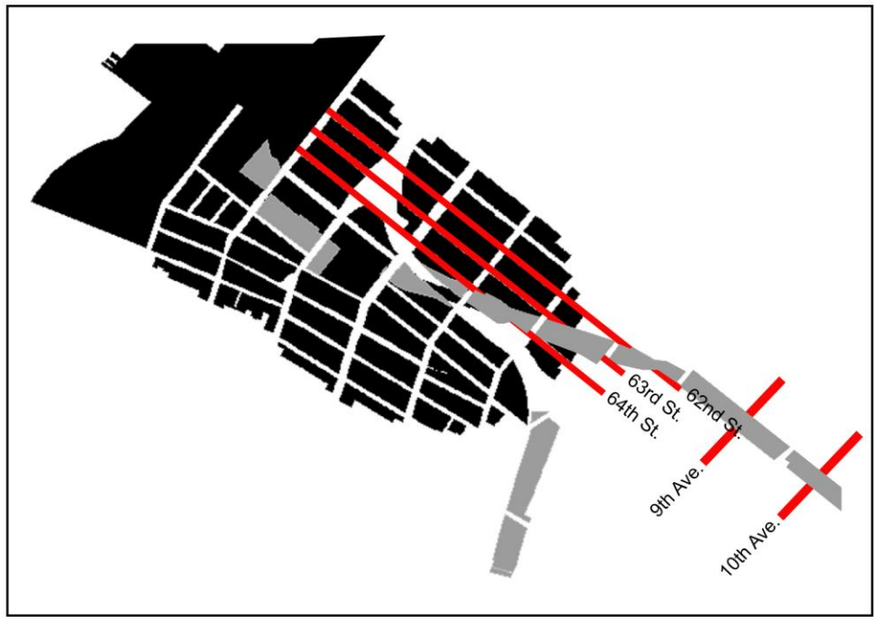
The graphic on the following page provides a particularly vivid example: The LIRR Bay Ridge Line, currently used for freight by the New York and Atlantic Railway,

[15] An existing example is Herbert Lehman High School, built on the south side of East Tremont Avenue over the Hutchinson River Parkway in the Bronx.

[16] For example, pedestrian overpasses once existed at Albemarle Road and Glenwood Road over today's B and Q (Brighton) Line.

was originally built between 1871 and 1877; its grade crossings were eliminated by 1918. The open cut portion of the route intersects with 76 streets from the Bay Ridge shoreline to east of Albany Avenue. Only 33 of these fully pass over the alignment.

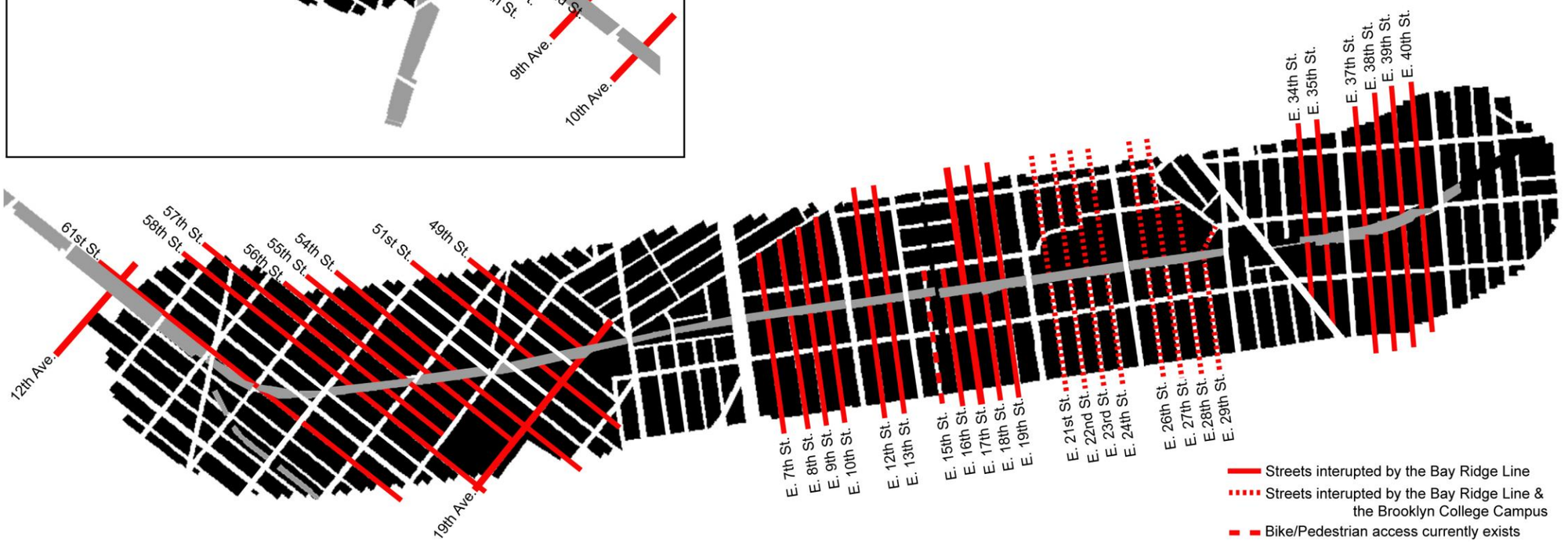
Even excluding the 14 streets which cannot realistically be rejoined due to property limitations (such as the Brooklyn College campus), 29 roads are totally or partially interrupted by the Bay Ridge Line trench.



Streets Interrupted by the Construction of the Bay Ridge Line

*West of New Utrecht Avenue, the Bay Ridge Line shares an open cut with the N (Sea Beach) Line.

** Due to subsequent construction, not all of these streets could be remapped even if a deck were constructed.



Limited-access highways, most of which opened between 1935 and 1975, were built in a very different urban environment than their railroad predecessors. While considerable stretches of highway were built on landfill and some utilized underdeveloped corridors, many were built through established neighborhoods which were either fully or mostly developed. Many streets that once crossed these alignments were not rebuilt, although service roads partially mitigated highway trench-related mobility losses in a way that usually wasn't done next to rail trenches. Also, it should be noted that, in some open cut sections, surface streets were more frequently preserved than they were over rail lines. For example, in the Mount Hope section of the Bronx, 13 of 17 roads which cross the Cross-Bronx Expressway right-of-way were rebuilt above it, while nine of 11 potential street crossings above the Brooklyn-Queens Expressway in Woodside exist. Nonetheless, these discontinuous streets have the same effect as they do over rail corridors: traffic patterns are warped, bicycle and pedestrian movements are stymied, and bus service is limited by a lack of options if a rerouting is desired or needed.

This inventory will provide a list at each corridor of surface streets that can potentially be remapped over corridors. Whether they should be remapped – or partially reconnected with pedestrian overpasses – is a question that would require more study and discussion at the neighborhood level.

3.8: Noise and Air Pollution Reductions

Pollution is a constant issue for those who live or work next to road and rail corridors, but the type, consistency and intensity of the pollution varies by mode. Decking can greatly reduce noise levels in the surrounding community, and can channel air pollution into particulate filter traps and ventilation shafts, potentially improving neighborhood quality of life. Section 4.5 considers the inverse; the cost of building surface level decking over transportation corridors and mitigating vehicular emissions which decks restrict from escaping into open air.

Depending upon scheduling and service frequency, corridors exclusively used by freight rail experience relatively infrequent bursts of air and noise pollution. Locomotives are the primary source of air pollution. (Usually, one locomotive is sufficient for a train, but exceptionally long or heavy trainsets might require two or three). Locomotives from a distance of 30 meters can be as loud as 90dB, and are a source of nitrogen oxide and other particulate matter.[17]

Within New York City, dual-mode locomotives, which can draw power from the third rail in electrified territory, are used for some through trains that enter the Bronx, Queens and/or Manhattan from non-electrified territories such as the Oyster Bay, Port Jefferson and Montauk lines of the LIRR, and Metro-North's upper Hudson, Upper Harlem and Danbury Branch lines. Amtrak also uses electric-powered and dual-mode locomotives within New York City. New Jersey Transit, which uses Sunnyside Yards for storage, uses electric locomotives within New York, but is developing its own dual-mode locomotives in preparation for one-seat rides from non-electrified NJT territory upon completion of new trans-Hudson River tunnels. The use of such dual-mode locomotives has obviated most emissions concerns about decking over commuter or long-distance rail routes. Only the occasional diesel-powered maintenance vehicle would produce any measurable pollution.

In recent years, more energy-efficient, cleaner-fuel locomotives have been developed. For example, RailPower Technologies Corp.'s Green Goat locomotive is meant for yard movements, meaning that it has potential applications in places like Sunnyside Yards or, subject to weight limits, anywhere that New York City Transit has maintenance-of-way vehicles (such as the 38th Street Yard in Brooklyn). RP Series road switcher locomotives are intermediate-class engines meant for short-to-medium haul trips to and from yards. Reduced-emissions locomotives could be used by New York and Atlantic Railway, the private freight operator that utilizes LIRR-owned tracks – including Brooklyn's Bay Ridge Line. Both vehicles emit between 80 percent and 99 percent less NOx and particulate matter than conventional locomotives.

Multiple-unit, electrically-powered commuter rail cars make up the majority of commuter train movements in the City. They do not emit appreciable amounts of as air pollution, but they do emit heat from their ventilation and air conditioning systems. As for noise, commuter rail service is much more frequent along mainline corridors than freight-only routes; as of July 2006, both directions of the LIRR Main Line between Penn Station and Jamaica had a total of over 22 trains per hour

[17] All noise data in this section is from the *MTA/LIRR East Side Access FEIS* (March 2001), "Chapter 11: Noise and Vibration."

scheduled between 3:00pm and 7:00pm, not including trains to Hunters Point Avenue. These sorts of frequencies are comparable to a fairly busy two-or three-track subway line. As of 2001, noise levels on the LIRR between Jamaica and Woodside were 71dB, which is higher than the ambient noise in a predominantly industrial area and roughly equal to being 15 meters from a highway.

Subway trains have a similar pollution profile as multiple-unit electric commuter cars, but are noisier and usually more frequent. Even overnight service has a bidirectional total of six trains per hour. Heat exhaust is an issue in and around subway yards, as approximately two-thirds of the existing fleet's HVAC systems are often left on while out of service. However, this problem is expected to gradually diminish and then disappear over the next 25 years. The newest cars in the fleet – the R142, R143 and R160 – all have an energy conservation mode, in which they "go to sleep" when laid up in railyards. With most systems off, these cars emit virtually no heat when inactive. Regular maintenance, though, will still periodically require trains to be fully powered.

Highway noise levels approximate 70-75dB (when 50-100 feet from the highway). Engines, exhausts, and the interaction of tires on pavement are the primary causes of highway noise.[18] Sound barriers usually reduce this noise impact by half, or by 10db. However, sound barriers have limited relevance for subgrade highways, since some of the noise within the open cut is absorbed by surrounding vegetation.

Decking over transportation corridors requires ventilation technology to manage air quality, ensure fire safety and mitigate pollution. Ventilation technologies are constantly improving and are designed for a specific site's needs. Ventilation is further discussed in section 4.5.

3.9: Service Reliability and Reduced Weather Exposure for Corridor Users

Decking over a road or rail corridor does not only benefit surface users. It limits exposure to the elements, reducing maintenance costs for road and rail agencies alike. New York City Transit would benefit from more enclosed segments of its system. When severe weather strikes – especially snowstorms – NYCT implements a special plan to get as many vehicles into tunnels as possible. Usually this means temporarily halting express service so that trains can be stored on these tracks, which limits passenger mobility. Particularly severe weather can also truncate train service in outdoor areas – especially on embankments and open cuts, where snow cannot fall through the open deck of an elevated trestle. Covering over train yards and open cuts would blunt the impact of these major weather events. Commuter rail yards and some rights-of-way within City limits would similarly benefit by providing more shelter for cars and facilities, although given the outdoor nature of most of the surrounding commuter network, operational gains would be limited.

[18] Ohio Department of Transportation, Office of Environmental Services. http://www.dot.state.oh.us/oes/noise.htm; FHWA Highway Noise Barrier Design Book, Chapter 3: "Acoustical Considerations." http://www.fhwa.dot.gov/environment/noise/design/3.htm

4: CONSTRAINTS

Chapter 3 of this report provides several justifications for making use of the rights-of-way above subgrade corridors and yards. However, several factors – economic, physical and political – may limit the ability to fully realize the potential of these air rights. This chapter explores these.

4.1: Upfront Capital Cost

Decking over a transportation corridor can be very expensive. *A Civic Vision for Turnpike Air Rights in Boston*, a 2000 publication that recommended strategies for developing subgrade portions of the Massachusetts Turnpike within Boston, 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 valued at $50 per square foot. Such high upfront costs push up the scale of profitable air rights uses. Wrapped into those initial costs may be several sub-projects that a standard development may not have, such as retrofitting the road- or railbed below to create space for support columns, or providing adequate ventilation and lighting for the newly-created tunnel. The high cost of decking increases the financial risk of such a project and limits the range of potential developers to those who have the money and patience for such an undertaking.

4.2: Ongoing Deck Maintenance Costs

Once the deck is built, it needs to be maintained. While maintenance costs would initially be minimal, they would gradually mount as age and weather take their toll. Eventually, substantial parts of the deck may need to be replaced entirely. Such maintenance and replacement will need to be accomplished without disrupting the flow of traffic below, adding expense.

4.3: Short-Term Disruptions to Subgrade Road and Rail Operations

Building a deck over the relatively tight confines of a road or rail corridor may require temporary closures or reroutings affecting the highway or rail right-of-way. With a multilane limited-access highway, this may involve temporarily closing one or more lanes of traffic at a time. With railroads, train traffic may have to be moved to an alternate track within the same alignment, rerouted to another alignment altogether, or rescheduled to allow uninterrupted access to the deck underside during off-peak hours. All of these measures are potentially disruptive, and there may be additional costs for providing the personnel and equipment needed to safely divert or slow down traffic in the construction area.

4.4: Viability of Supporting Columns in Road/Rail Beds

With the exception places such as of Grand Central Terminal (which was developed with a "Terminal City" of air rights development north of the station house in mind), the James A. Farley Post Office (above the Northeast Corridor, west of Pennsylvania Station), and isolated exceptions like Newkirk Plaza in Brooklyn (which had a deck supported by columns that began at platform level), most right-of way construction did not set aside space specifically for support columns.

Retrofitting existing road or rail uses to provide room for deck supports has the potential to be a lengthy, costly, disruptive process. Locations where support columns would be needed to sustain a deck, rail or subway tracks may require realignment of existing facilities and/or provision of expensive transfer beam structures. If the right-of way in that location is too narrow to allow tracks to be moved, widening the open cut itself would be necessary – which may be difficult or impossible if adjacent development or surface roads stand in the way. Inserting columns and constructing a deck needs to be coordinated with the need to maintain service in the right-of-way or yard. Similar issues may arise with decking over highways.

Further complicating the question of where to put support columns is the issue of whether the land itself can support a deck at a reasonable price. The high cost of decking may be further inflated at some locations, since many transportation facilities, such as the Coney Island Yards, were built on swampland. Underlying geology is an issue. Prior to evaluating a site, test borings would be needed to definitively determine how deep and strong any supports must be at individual sites.

4.5: Ventilation, and Impact of Emissions on Overhead Land Uses

Any substantial enclosure of an open cut or yard would probably require ventilation. For highways under free-flowing traffic conditions, a deck that seals the whole width of an open cut at surface level can, according to one engineer in the Federal Highway Administration's New York Division, be up to 500 feet long before mechanical ventilation is needed, since free-flowing traffic pulls air in and propels it out at shorter lengths. No uniform standards exist in the United States pertaining to how

long a tunnel must be before ventilation is required. According to the Federal Highway Administration, when the length between "portal to portal is less than a safe stopping distance for the design speed" the enclosed portion is considered a short tunnel.[19] In locations with chronically congested traffic, the distance required before ventilation is needed may be far shorter, since idling vehicles pollute more while circulating air less.

The closest thing to a consensus on the subject may be a set of standards published by the National Fire Protection Association. Their publication, *NFPA 502: Standard for Road Tunnels, Bridges and Other Limited Access Highways*, has become the industry standard for tunnel ventilation. Tunnels less than 90 meters long are not required to meet standards. Tunnels more than 90 meters are required to meet some standards and tunnels more than 300 meters are required to meet all NFPA standards put forth in the 502 document. Some of the standard requirements include: fire detection, communication systems, traffic control, standpipe and water supply, ventilation, drainage, emergency response planning and emergency access and egress points. Other organizations such as state or local agencies and the Environmental Protection Agency also have requirements concerning air quality.

For highway corridors, this report will use the NFPA 90-meter standard. Ninety meters equals approximately 295 feet.

Each tunnel location is different; there is no "one size fits all" ventilation application. Choosing the appropriate ventilation system occurs after a thorough analysis of tunnel length, surrounding geography, elevation, grade, width, traffic volume, direction of traffic, air quality pre- and post-tunnel construction, use, etc. Adequate ventilation is required to meet the needs of the location and mitigate environmental impacts brought about by the tunnel. The Federal Highway Administration provides detailed explanations and diagrams of ventilation systems used in the U.S. on their website.[20]

Basic ventilation for newly-enclosed subgrade commuter rail or transit alignments could be achieved through standard sidewalk grates, since most railbeds will be immediately below the surface. If an actual ventilation facility is desired to pump air out of the trench during a fire, it appears that the current MTA/NYCT thresholds for placement of new vent plants are that a) there must be satisfactory ventilation at both ends of each station, and b) for exceptionally long distances between stations, vent facilities should be no farther from each other than about nine short city blocks, or a little less than half a mile.[21]

Adequate ventilation and noise reduction over vehicular open cuts can be difficult to achieve. One NYC example is the Bridge Apartments, consisting of four 32-story 240-unit apartments which straddle the Trans-Manhattan Expressway in Washington Heights. Over 4,000 residents live in the development, which was built at the same time the expressway and opened in 1963-1964. The Port Authority of New York and New Jersey transferred the air rights over the expressway to the City, which then auctioned off those rights to a developer.[22]

The constant noise and exhaust have been problematic for the Bridge Apartments residents. A 2004 New York Times article reported that, "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."[23]

4.6: Parkland Ownership and Alienation

As an inventory, this report is not making recommendations to deck over transportation corridors in mapped parkland. It is important to note, however, that much of the green open space alongside the City's expressways and highways, and

[19] "Ask the TVT Expert," Federal Highway Administration, January 2007. http://www.fhwa.dot.gov/bridge/tunnel/qa.htm. The FHWA website states that "[t]here is no accepted standard definition for a tunnel. According to AASHTO a short tunnel is one with a length portal to portal less than the safe stopping distance (SST) for the design speed, and a long tunnel is one with a length portal to portal greater than the SSD. A structure can be classified as a tunnel when the construction method used involved any tunneling construction technique. A long underpass may need to be designed as a tunnel to provide a safe environment to the traveling public if location, geometry or traffic conditions warrants special services like ventilation, lighting, and emergency systems."

[20] http://www.fhwa.dot.gov/bridge/tunnel/tunres2.htm

[21] Chapter 2 of both the Second Avenue Subway and LIRR East Side Access FEISs propose ventilation facilities at these intervals.

[22] "Life on the Road; Learning to Sleep as Trucks Roar Through Basement," By David W. Chen. New York Times, June 18,2004

[23] Ibid.

some highway medians, is under the jurisdiction of the Department of Parks and Recreation.[24] Such properties present complex ownership and acquisition issues because all parkland must undergo alienation proceedings enacted by the New York State Legislature in order to be turned over for non-park use. The alienation proceedings come into play because parks exist for the unrestricted benefit of the entire public. Thus, parkland alienation usually requires substitute parkland to be created of equal or greater a) fair market value, b) size, and/or c) potential recreational usefulness. However, with the exception of parklands that received funding from specific state and federal programs – which have stricter alienation/substitution rules – there is some latitude in requiring that all three of these criteria for substitute parkland be met.[25] In April 2005, the State Office of Parks, Recreation and Historic Preservation published a revised *Handbook on the Alienation and Conversion of Municipal Parkland*, which 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.

"Parkland" takes different forms for "parkways" where no large commercial traffic is permitted[26] and for "expressways" where commercial traffic is allowed. On parkways, no one single rule applies. A hodgepodge of ownership and maintenance governs these corridors. For example:

- The Grand Central Parkway roadbed is owned by New York State, but the adjacent green space is owned by the New York City Department of Parks and Recreation.
- The Belt Parkway is entirely owned by Parks, but the New York City Department of Transportation is responsible for road maintenance.
- North of the Cross Bronx Expressway, the Hutchinson River Parkway is City-owned; south of the Cross Bronx, it is state-owned.[27]

Any proposal to make use of the air rights over a parkway right-of-way would have to resolve issues with the multiple agencies involved.
Expressway alignment ownership is simpler. The New York State Department of Transportation owns and maintains all of the City's expressways, while the NYC Department of Parks and Recreation owns and maintains the surrounding parkland. These green spaces are not technically counted as part of the expressway that they bracket, even if they occupy the same subgrade cut. However, each park property is identified with a numeric code that associates it with the adjacent expressway.

Unless a deck were to be built only over the area immediately above the highway and leave the surrounding green space open, some land would probably have to be alienated. Even if the peripheral parkland was regraded and elevated in place, the question of whether such an act is alienation would need to be addressed.[28]

Incorporating parkland into the deck plan as a land substitution strategy could be considered by both the public and private sector, as new surface parkland yields more usable recreational space for surrounding communities. Currently, almost none of the green space in an open cut surrounding one of these roadways is open to the public, either for passive or active recreation, making any public access an improvement.

4.7: Erratic Topography

Not all roadways, yards, or rail corridors are surrounded by level land. Numerous examples exist throughout NYC, from Sunnyside Yards to segments of the Major Deegan Expressway to the B and Q (Brighton) Line immediately south of Prospect Park station. A dramatic example is the FDR Drive on the Upper East Side of Manhattan, where buildings flush with street level on the west are built atop the highway, with the East River immediately to the east.

[24] With the exception of Amtrak's Empire Corridor, few rail or transit alignments included in this report run through significant stretches of parkland.
[25] In the rare cases that alienable parkland is not easily replaceable with a nearby parcel of land, language can be inserted into the alienation bill setting aside either an amount equivalent to the alienated parkland's fair market value or the proceeds of the parkland sale for capital improvements to other parks or the eventual purchase of new parkland. (*Handbook on the Alienation and Conversion of Municipal Parkland;* New York State Office of Parks, Recreation and Historic Preservation, p.21)
[26] A small but crucial exception to this rule allows trucks on the short stretch of the Grand Central Parkway between the western leg of the Brooklyn-Queens Expressway (I-278) and the Triborough Bridge.
[27] *Tree and Landscape Management along New York City Parkways: Preliminary Report*. NYC Department of Parks and Recreation, February 2006
[28] DCP Counsel's interpretation of alienation, December 2007.

Whether the surface elevation difference is naturally occurring or the result of construction, decking over a site with inconsistent surface levels presents special challenges. FHWA Airspace Guidelines require minimum clearances:

> "The proposed use of airspace above the established gradeline of the highway shall not, at any location between two points established 2 feet beyond the two outer edges of the shoulder, 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.[29]"

Standards for railroads and transit are less uniform; consultation with owners and operators of those corridors would be needed to determine an acceptable deck ceiling.

One or more locations along the deck perimeter must be able to connect with the street level, or close enough to the street level or adjacent properties, for a parcel to be included in this report. (Subway and rail yards are an exception to this rule.)

If the deck is large enough to accommodate automobiles, and if the intended deck use doesn't preclude automobiles entirely (i.e. a park occupying a full parcel), at least one perimeter location should be both flush with the surface and wide enough to carry at least one traffic lane in each direction.[30] For very large decks – ones that are large enough to provide streets upon – vehicles would need to be able to get on and off the deck at multiple locations along the perimeter, unless vehicles are specifically restricted on the deck. Ramps may be needed to convey vehicles between sizable vertical gaps, but will need to be of a sufficiently gentle grade to allow trucks and buses to easily reach the deck, if their presence is anticipated.

[29] *Airspace Guidelines to 23 CFR 710.405 - 710.407*, Question 710.405_15. At locations where control and directional roadsigns are need to be suspended from the underside of the deck, the height limit increases to 20 feet. See http://www.fhwa.dot.gov/REALESTATE/airguide.htm for the full guidelines.

[30] Smaller parcels, either on their own or as part of a larger deck project, may be able to get away with a single travel lane or a loop, depending on anticipated traffic generated by the development. Ramps between the deck and the surrounding area are also possible to access smaller parcels above the street plane, but could consume valuable deck space.

4.8: In-Ground Structures Exceeding Deck Plane

Railyards and transportation corridors, especially those used by trains, do not consist of just track. Support structures are needed – substations, utility and catenary lines and supports, storage rooms, maintenance facilities, and light or radio towers. Sometimes these structures are quite large, and sometimes, in a subgrade area, are big enough to rise above the surrounding surface plane. For potential air rights uses, this would cause problems.

Amtrak's service and inspection building (at left in photo) would break the plane of a deck over parcel Q8007, Sunnyside Yards.

Many subway and rail yards present potential developers with operational issues such as how to treat maintenance buildings and other structures that may impede a single, all-encompassing deck. It may be necessary to replace such facilities or make design adjustments in order to make surface-level construction possible where in-ground structures exceed the deck plane.

4.9: Security and Emergency Exits

Ensuring adequate security features and emergency evacuation egresses must also be considered in deck creation. Evacuations and traffic diversions will be easier in an open cut than in a tunnel, and security issues will likely be less complicated in an open trench. Thus, retrofitting of the cut to provide emergency entrance and exit points is crucial. Incorporating additional security features that augment public safety for drivers/rail passengers may be a factor in obtaining public, legislative or fiduciary support for a decking project.

5: ADDITIONAL CONSIDERATIONS

5.1: Deck Creation Issues

Decking to create land is a high cost and high risk venture. Current research indicates that construction costs for decks range nationally from $300/sf to $700/sf.[31] In addition to the costs of deck construction, the cost of land and air-rights acquisition and the cost of building construction must be added, effecting the number, shape and size of sites in New York City where decking may prove to be practical.

5.2: Potential Factors Affecting the Viability of Decking

While potential corridors and parcels contained within this study are not ranked in any way, general assumptions can be made about how an area's surroundings can affect its viability for decking.

This study presents an inventory of all potentially deckable sites above transportation rights-of-way in New York City. It is divided into the three major different types of right-of-way—rail cuts, rail yards and vehicular cuts—and then subdivided by borough. Rail cuts, rail yards and vehicular cuts differ from each other in terms of width, size, ventilation requirements, and relationship to ground level. These differences limit the type of uses to which each type of right-of-way may be put and represent different opportunities for decking. Some defining characteristics are as follows:

- Rail cuts:
  - Narrow (usually one to four tracks wide)
  - Ventilation requirements determined by type of train propulsion system (i.e. diesel vs. electric) and length of potential enclosure
  - Frequently run through midblock rights-of-way

- Rail Yards:
  - Uniquely large parcels of land, often with considerable width
  - Not always below grade
  - Ventilation required

- Vehicular Cuts:
  - Wide (usually multiple lanes of traffic in two directions)
  - National Fire Protection Association, an industry standard, recommends certain ventilation and egress requirements for tunnels exceeding 90 meters (approximately 295 feet.)
  - Often bracketed by service roads

All sites within the inventory could be affected by one or more of the following factors.

1) Current and/or Surrounding Zoning

Decking over transportation rights-of-way is an expensive proposition. Average estimated construction costs can range nationally from $300/sf to $700/sf depending on cost of materials, labor costs, deck size, soil conditions, ventilation requirements and other engineering issues. As a result, privately built buildings constructed over transportation rights-of-way are often large and tall in order to minimize the cost of footings and decking and to provide sufficient revenue to justify the level of investment required. However, such proposals need to be evaluated in the context of the communities in which they would be built. All surface land uses built upon decks need not be "contextual," but would have to be carefully studied and evaluated for its appropriateness at its specific location.

2) Proximity to Subway or Other High-Volume Public Transit System

Locating new decking close to mass transit provides the opportunity to support more people with fewer cars, less congestion and less vehicular pollution. This is in keeping with the City's 2030 housing and environmental goals.

3) Effect on Existing Green Open Space or Parkland

Maintaining and increasing green open space is an important component of the 2030 PlaNYC and New York City's future development and sustainability goals.

A number of the city's rail and vehicular right-of-ways lie in "hard cuts;" essentially three-sided tunnels or tunnels without a roof. Such rights-of-way often represent relatively easy decking candidates because the full extent of the cut is clearly defined, depth below grade is constant and the cut itself is typically seen as an undesirable aspect of the landscape which decking could remediate.

[31] $500/sf is used in Alexander Garvin's 2006 *Visions for New York City: Housing and the Public Realm*

Other rights-of-way sit in "soft cuts," nestled at the bottom of sloped and often wooded embankments. These cuts may present problems because the deck will need to be wider to span the cut and sloped embankment and because there may be dramatic grade changes. In addition, while wooded embankments and parkland alongside rights-of-way are not usable as active recreation facilities, such spaces constitute part of the limited stock of parkland. In some cases, especially along vehicular rights-of-way like parkways, alienation of parkland may also be necessary. Alienation requires approval of the State Legislature and is required regardless of whether or not the parkland is accessible to the public.

Both hard and soft cut conditions may have decking potential, depending on the surrounding conditions and location.

4) Effect upon Abutting Properties

New York City's Zoning Resolution states, as one of its purposes, that it "provide[s] for access of light and air to windows and for privacy, as far as possible, by controls over spacing and height of buildings and other structures."[32] This is enforced by side and rear yard regulations as well as regulations governing FAR, setbacks and height. The potential for decking over transportation rights-of-way needs to be evaluated in the context of how the deck and whatever land use is being supported by it would affect adjoining properties. Such uses could enhance the vitality of an area but could also raise issues of congestion and access to light and air.

5) Sufficient Access Points to and from Surrounding Areas

While most rights-of-way that run in, or directly next to, existing streets have ample access points, those that run through blocks often raise problems. For example, in Brooklyn, many rail right-of-ways run lengthwise through the middle of residential blocks. (See Figures 1 and 2.) Access to the transportation right-of-way, except at the end of each block, would be severely limited. Decking of the end parcels might be feasible and possibly desirable in areas with commercial overlays, but interior decking would most likely not.

A second common scenario occurs where the right-of-way cuts through the block laterally (see Figure 3. In such situations, the site could essentially be treated as two individual properties with abutting rear yards. Access to such a site would be readily available.

Additional access problems may occur when the parcel(s) in question are at or above grade – a situation that arises with some subway and rail yards throughout the City. While decking over these yards may be viable, it would be wholly or partly on a raised deck, meaning that any access to the parcel itself would have to come via stairways, elevators, or ramps to and from street level.

Figure 1: Parcel K3219 on the NYCT N (Sea Beach) Line is an example of Figure 2 below. Development immediately adjacent to the abutting backyards may be difficult.

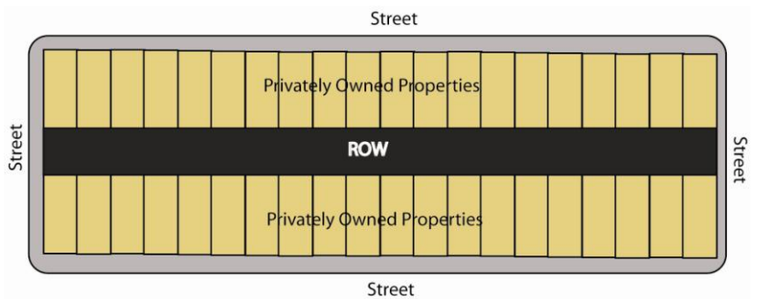


Figure 2: A right-of-way running lengthwise through the middle of a block.

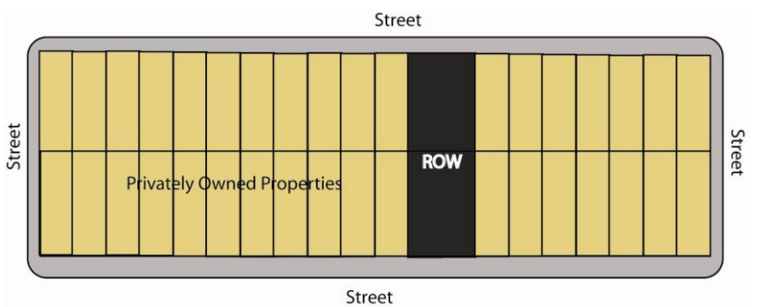


Figure 3: A right-of-way running laterally through the middle of a block.

[32] Zoning Resolution, Section 21-00f