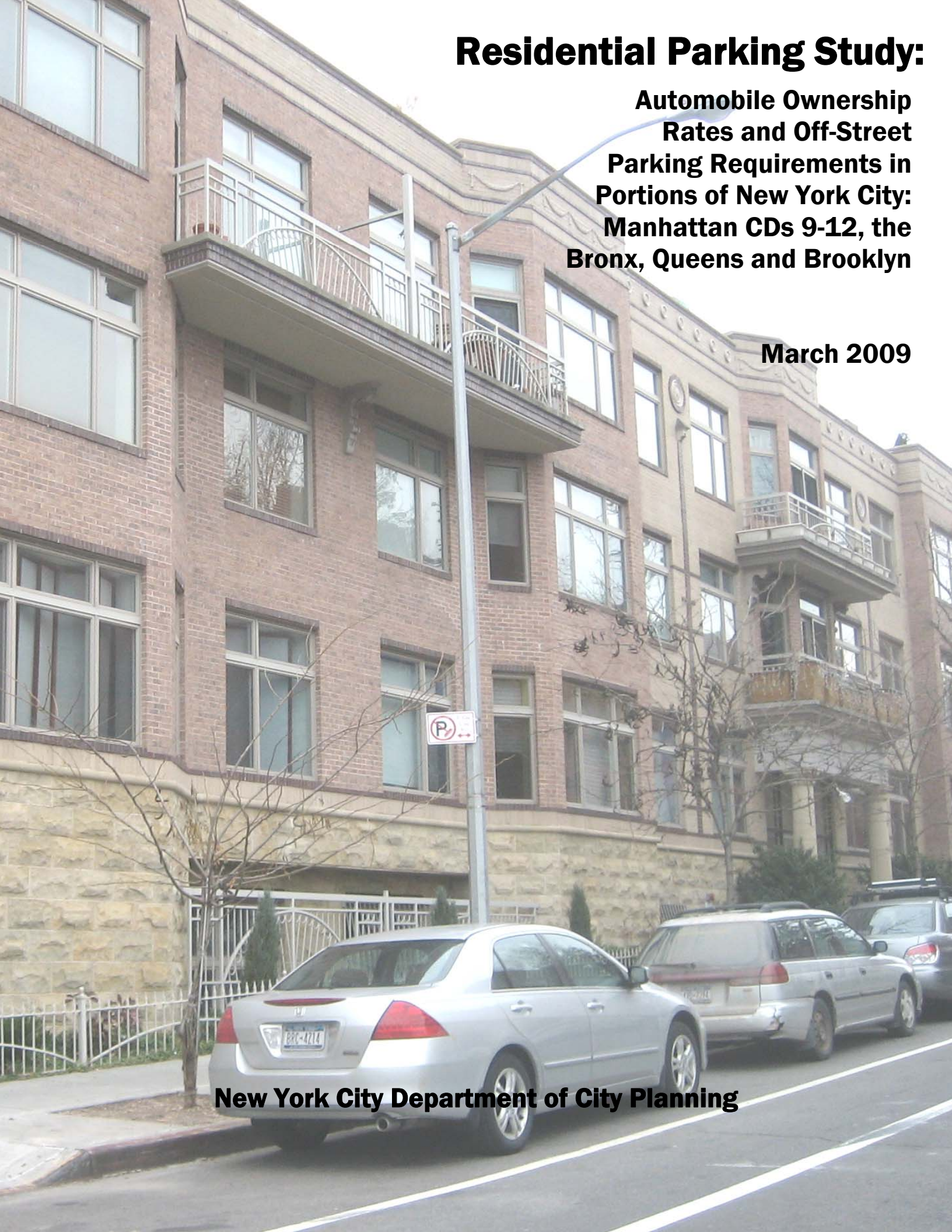


Residential Parking Study:

**Automobile Ownership
Rates and Off-Street
Parking Requirements in
Portions of New York City:
Manhattan CDs 9-12, the
Bronx, Queens and Brooklyn**

March 2009



New York City Department of City Planning

The preparation of this report (PTCP05F00.03) 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.

Key data were provided by the New York State Department of Motor Vehicles and the New York City Department of Buildings.

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Executive Summary

Since off-street parking requirements for new residences were first instituted in 1950 in New York City's Zoning Resolution, the city's planners have struggled to find the right formula for balancing competing priorities. These include neighborhood concerns about overutilization of on-street parking, developers' concerns about the cost of providing parking, and environmental considerations to reduce congestion and improve air quality by discouraging automobile ownership and use in transit-rich areas of the city. The recent surge in housing development and the cars associated with those new households has intensified the debate about parking requirements in New York City. Some communities – particularly those distant from the Manhattan Core – have argued that new housing with insufficient off-street parking has resulted in an under-supply of parking that negatively affects quality of life as drivers cruise in search of over-taxed on-street parking. Others have argued the opposite – that zoning requirements have encouraged car ownership, even when it might not be needed, resulting in more cars on the street, more congestion and more pollution.

In response to these concerns, the Department undertook this citywide study of both the Zoning Resolution's parking requirements for new housing and the car ownership patterns of the residents of such housing. After reviewing the demographic and land use contexts that affect rates of automobile ownership, the study examines patterns of auto ownership. Using quantitative data from the New York State Department of Motor Vehicles, the Census and the New York City Department of Buildings, the study analyzes the patterns in auto ownership with regard to building type and location in the city in order to determine whether current parking regulations reflect demand for parking. In addition, it examines other factors that should be considered in crafting more appropriate regulations that balance contemporary needs and goals, such as improving neighborhood quality of life, reducing congestion and pollution, encouraging the use of mass transit, and accommodating the needs of families.

Population Growth and Housing Development

New York City's population passed 8 million for the first time in 2000, gained an additional 302,000 persons by July 1, 2007, and is expected to grow even further. This population increase has been facilitated by the highest levels of new housing construction since the early 1970s.

New York City's housing growth outpaced the region's in the years after 2005, reversing the decades-long dominance of the suburban housing market. The reasons for this trend could include a renewed demand for urban living, immigration, and suburban land use policies that restrict the amount of new housing development. Regardless, the trend suggests that New York City is increasingly attracting households that might otherwise choose to live in the suburbs and own many more cars, and drive many more miles. To better accommodate these changes, the city's land use policies since 2002 have directed growth away from the city's auto-dependent fringes towards the transit-accessible areas closer to the city's core.

Study Methodology

This study compares vehicle registration data from the New York State Department of Motor Vehicles with new construction data from Department of Buildings Final Certificate of Occupancy filings for 1995 to 2005. The study also utilizes data from the decennial Censuses and the 2006 American Community Survey conducted by the Census Bureau.

Study Findings

Finding One: Ownership patterns vary by age of housing, location, and building type

a. Age: A comparison of the city's total housing stock to the new housing stock analyzed in this study (permitted 1995 to 2005) shows a significantly higher number of cars per household in new housing.

b. Location: Location has a major impact on auto ownership rates. An analysis that involved the mapping of vehicle registrations showed that the number of registered cars per household increased as distance from the Manhattan Central Business District (CBD) increased. This direct relationship between location and vehicle registrations is likely influenced by access to transit and density, as both housing density and transit access tend to decrease as one moves away from the core of Manhattan.

c. Building Type: In addition to location, this study identifies building type as a primary factor in predicting auto ownership. The study divided auto ownership data into three building type categories: one- and two-family, three- and four-family, and multi family buildings (five or more units). These housing types generally align with three distinct markets for housing which are typical in New York City – single-family homes and townhouses; lower density walk-up apartment houses and infill development; and mid- to high-density apartment buildings. When separated by building type, effectively isolating for the effect of location, one can recognize the impact of housing density (units per building), as determined by these specified building types, on auto ownership. In general, as density increases, car ownership decreases.

d. Combined Effects of Location and Building Type: Having identified the strong impacts of both location and building type on auto ownership, ownership data were further parsed in order to demonstrate the combined impacts of these two factors. Auto ownership per household can be observed to increase with distance to the CBD and decrease in buildings with a larger number of dwelling units.

Finding Two: Current requirements frequently do not reflect ownership patterns, suggesting that parking requirements may fall short of demand in some parts of the city and exceed demand in others

Finding One presents two major determinants for auto ownership – housing type and distance from Manhattan’s CBD. Residential off-street parking in New York City is now regulated by zoning district, with an increase in requirements for lower density districts. Since permitted residential densities typically decrease as one gets further from the Manhattan core, the type of building and its location are implicit in the parking requirements. The lowest density districts – which have the highest parking requirements -- are generally mapped the furthest from the Manhattan Core.

However, these patterns aren’t consistent throughout the city.. For instance, many mid-density districts are mapped along transit corridors in lower-density parts of the city, resulting in a mismatch between requirements and demand for parking in the area. Furthermore, in medium and high-density zoning districts throughout the city, waivers of parking exist for small lots. Subdivision of existing lots is common and permits development that does not provide any off-street parking, irrespective of the car ownership patterns.. Conversely, the underlying parking requirements in locations close to the Manhattan core may be too high.

Finding Three: Demographic variables influence car ownership

Families – families with children in particular – tend to select lower density housing and have higher levels of car ownership in all types of housing and in all locations when compared to non-family households. Middle and higher income households with incomes in excess of \$60,000 are also more likely to own cars.

Finding Four: Proximity to transit has a modest influence on car ownership, depending on building type.

The average number of cars per unit in new housing declines among units near a subway station, compared to units farther away. Among single- and two-unit buildings, however, the influence is minimal, and among three- and four-unit buildings proximity to transit has only modestly greater influence. Among buildings with more than five units, the difference in cars per household is most pronounced in the Bronx and Queens (and to a lesser extent in Brooklyn) where new multi-family housing proximate to a subway station tends to have fewer cars per unit than new housing farther away. In Manhattan, there are not locational differences in car ownership with respect to proximity to subway stations since nearly all of Manhattan is well-served by mass transit. .

One reason for the modest influence of transit proximity on car ownership could be that New York City resident workers’ commutation patterns, in many cases, direct them away from the primary destination of transit in the city’s core, toward areas in the boroughs outside Manhattan or in the suburbs which are more conveniently accessed by car. An additional reason is that households own cars for other travel purposes, for which even accessible transit may not be considered an acceptable substitute.

Finding Five: Parking requirements are not a primary determinate of car ownership patterns

A review of the citywide auto ownership rates and changes in New York City parking requirements dating back to the 1920s suggest a weak relationship between car ownership and parking requirements. Social and economic trends independent of parking requirements seem to affect rates of auto ownership in more profound ways. In contrast, significant increases or declines in auto ownership have not occurred following major changes to parking requirements in New York City. For instance, there was not a spike in vehicle registrations after the city first required parking in 1950. Rather, the straight-line increase of the previous 20 years continued, before leveling off during the oil crisis and population declines of the 1970s. Likewise, vehicle registrations did not decline in Manhattan after the elimination of required parking requirements in the central business district, and the establishment of a maximum for allowable parking .

The results of this study show that even when zoning requirements are identical, rates of car ownership vary widely depending on the type and location of housing. This suggests that it is not requirements, themselves that influence car ownership. Rather, it is a range of factors, including housing density and distance from the core of Manhattan, income, commutation patterns, and the desire for mobility among certain groups (like families with children) play significant roles in influencing car ownership.

Conclusions and Policy Considerations

The current zoning district-based framework for regulating required residential off-street parking is an imperfect surrogate for all the factors that go into car ownership. In considering how to better regulate parking in the City, and potentially influence car ownership and the use of cars, a number of factors and measures must be considered.

The concept of parking demand management has been promoted in the planning literature but the number of policy levers available to the government may be limited. One measure that has received widespread attention is car-sharing, in which a private company rents out cars for short periods, allowing households with limited need to use a car to save money, relative to the cost of ownership. Car sharing reduces the total number of cars that need to be parked in the city and may reduce the total number of trips, because renters will be inclined to combine several errands in a single rental to save money. While car sharing companies are operating in New York City, they are also affected by the high cost of off-street parking and the limited availability of on-street parking. Government should explore ways of making this type of business more feasible to operate successfully. Greater reliance on bicycles can substitute for some auto trips and the City is undertaking a range of initiatives to promote bicycle use. Improvements in bus service, such as bus priority and select bus service, can improve travel times and make bus travel a more attractive alternative.

Other types of demand management are harder to foresee. The city has promoted commercial development in its Central Business Districts where the transit share for commutation is extremely high. However, the trends that are dispersing employment to the peripheral areas of the city and to the suburbs are also very strong. These include the growth of industries such as

health care, colleges and universities, and retailing which are dispersed throughout the region, as well as labor shortages in the suburbs due to the aging of the population and the lack of affordable housing. Provision of more mass transit to dispersed locations is in many cases difficult and costly. Other auto use patterns, such as those for shopping and recreation, may reflect strong consumer preferences.

The study highlights the competing concerns that are relevant to the development of parking policy including the lifestyle preferences of the public, improving mobility, ameliorating congestion, and environmental concerns. The data indicate that the inner ring areas closer to the Manhattan core in particular may offer the best opportunities to modify the parking regulations to achieve a better balance among these concerns. In other areas of the city, mismatches between the zoning requirements and neighborhood needs might be better addressed on a case-by-case basis through exceptions to the underlying rules and special zoning districts.

Recommendations for Further Study

In order to better address these competing concerns and recommend specific modifications to the residential parking regulations, the report identifies a number of areas of further study:

- Analyze building plans to examine the effect of off-street parking on urban design, parking lot layout, streetscape, and building typology;
- Update DMV auto registration data to determine trends in post-2005 buildings resulting from several major rezoning actions;
- Work with the New York City Department of Housing Preservation and Development to gain better information about the auto ownership characteristics of affordable housing residents;
- Evaluate impacts of parking requirements on the cost of housing;
- Evaluate impacts of proximity to transit on parking demand in greater depth to understand whether specific neighborhoods – such as areas served by more than one subway line or areas located near stations with express stops – offer important housing opportunities for car-less households;
- Explore demand management opportunities, such as car-sharing, bus service improvements, and bike lanes, bike parking, and bike sharing;
- Evaluate the supply of parking spaces in new housing relative to demand and existing requirements;
- Gain better understanding of patterns of vehicle utilization.

The Department is proceeding with much of this follow-up work as part of an “Inner Ring Study” which will examine in greater detail car ownership patterns in new buildings (affordable

and market-rate) in transit rich neighborhoods proximate to the Manhattan Core. The study will survey households in these areas to better understand how, why, and when cars are used, or alternatively, mass transit. Coupled with an evaluation of off-street parking regulations within these neighborhoods, the study will make recommendations for changes.

I. Introduction

Since off-street parking requirements were first instituted in 1950 in New York City's Zoning Resolution for new residences, the city's planners have struggled to find the right formula for balancing neighborhood concerns about overutilization of on-street parking, developers' concerns about the cost of providing parking, and environmental considerations to reduce congestion and improve air quality by discouraging automobile ownership and use in transit-rich areas of the city even as others seek to limit the amount of off-street parking. In recent years, frustration due to a perceived under-supply of parking at the neighborhood level has been expressed by many communities throughout the city. This can be seen most notably in community districts in Staten Island, Brooklyn, Queens, and the Bronx that are outside traditional business districts in historically low and mid-density residential neighborhoods. Such areas have experienced an increase in population and housing growth in recent years – two dynamics that can be expected to continue in the coming decades according to Department of City Planning projections. New York's chronically tight housing market – in which new housing is often marketable regardless of whether off-street parking is provided – creates an incentive for developers to minimize the amount of on-site parking and to take advantage of zoning rules allowing them to waive out of requirements altogether. Expressing concerns about inadequate residential off-street parking, communities have argued for higher residential parking requirements for new developments.

The Department has responded to local concerns on a community-by-community basis, where studies determined that increases in required parking were appropriate.

- In the areas with the highest auto ownership in the city – the low density zoning districts within Staten Island Community Districts 1-3 and Bronx Community District 10 (Throgs Neck) – “growth management” regulations increased required parking from one per unit to two spaces for a single-family home, and three spaces for a two-family home;
- Required parking was increased for medium-density zoning districts in Queens Community District 14 (the Rockaways) and is for St. George in Staten Island;
- The number of required parking spaces that can be waived for new housing was reduced in Downtown Jamaica in Queens, and similar changes are proposed in Dutch Kills and Forest Hills, also in Queens.

As these community issues were addressed, the need became clear for a citywide study of the relationship between the Zoning Resolution's parking requirements for new housing and the demand generated by the residents of such housing. After reviewing the demographic and land use context in which the Zoning Resolution establishes parking requirements, the study examines how these requirements relate to actual patterns of auto ownership. Using quantitative data from the New York State Department of Motor Vehicles, the Census and the New York City Department of Buildings, this study aims to understand patterns in auto ownership with regard to building type and location in the city in order to determine whether current parking regulations

reflect demand for parking. In addition, it examines what other factors might come into play in crafting more appropriate regulations meeting contemporary needs and goals.

II. Study Methodology

Study Scope: Excluded Areas

Separate off-street residential parking rules currently govern the “Manhattan Core,” located below 110th St. west of Fifth Avenue and below 96th Street east of Fifth Avenue. The rules, created in 1982, do not require any parking for new developments and limit permitted as-of-right parking. New housing construction in this area of Manhattan tends to consist of high density development on relatively small infill lots that are well-served by mass transit and where providing parking is often challenging. The parking issues in the Manhattan core are different from those in upper Manhattan, the Bronx, Brooklyn, and Queens and are not included in this study.

Staten Island was also excluded from the parking study, but for very different reasons. Although Staten Island’s public transportation system includes the Staten Island Railway and an extensive public bus system, the island is largely developed with low-density, suburban-style single family homes and townhouses, and Staten Islanders tend to rely much more heavily on their cars than most other New Yorkers for day-to-day activities such as commuting to work, shopping, and visiting friends and family. Over the last 10 years, Staten Island experienced rapid housing development, earning Richmond County the distinction as one of the fastest growing counties in New York State. In the midst of this development it became clear to elected officials, residents, and planners that the existing parking requirements, previously the same as for similar zoning districts in other parts of the city, were inadequate to meet the car ownership demand of new residents. In response to these concerns – widely expressed by Staten Island residents, civic organizations and political representatives – the parking requirements were increased for most of the borough as part of the *Lower Density Growth Management* rezoning in 2005.

Since the Manhattan Core and Staten Island already have off-street parking regulations tailored to their unique conditions, these areas were not included in the scope of this study.

Study Focus/Parameters

Brooklyn, Queens, Northern Manhattan, and the Bronx exhibit greater diversity than Staten Island and the Manhattan Core with regard to development trends, density, and access to transit – factors that can strongly influence car ownership patterns. Thus, the geographic focus of the study covers these areas in order to determine auto ownership patterns that can inform a contemporary, comprehensive policy for accessory off-street residential parking in New York City. Data on cars registered to new housing units completed between 1995 and 2005 were the primary focus of the analysis. Although the scope of the study was limited to ownership patterns in new housing, data for cars registered to all housing were also analyzed to understand the broader context of car ownership in New York City.

Data Collection/Generation

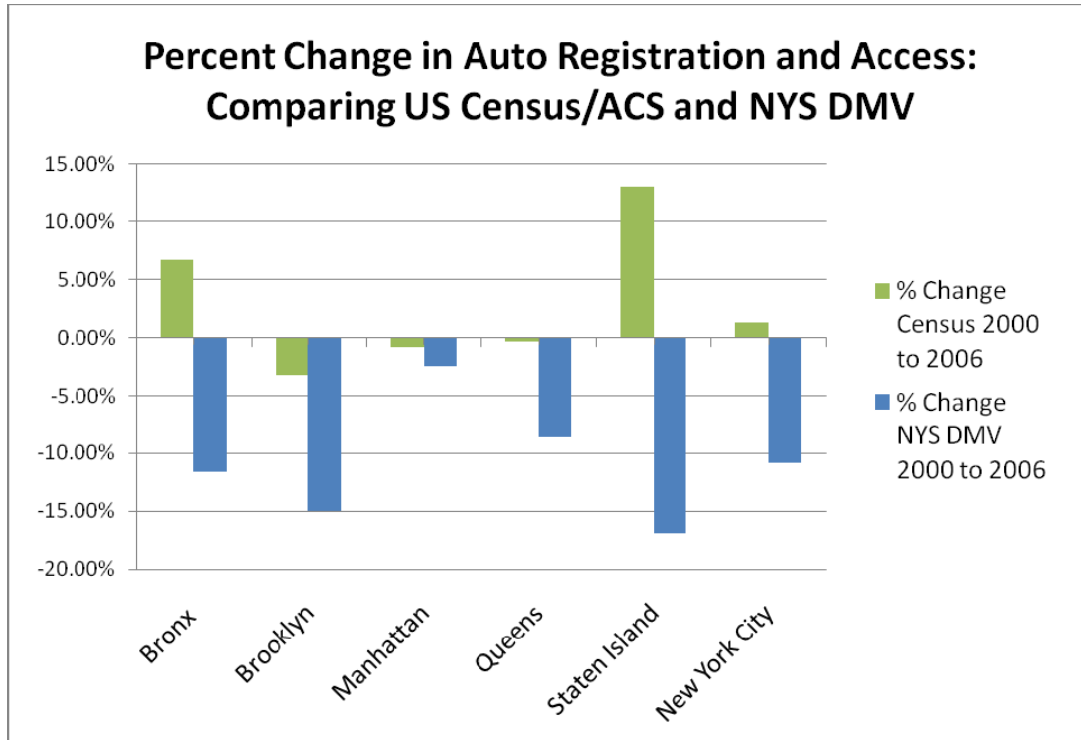
Data used for this study came from a variety of sources. The primary data source used was the New York State Department of Motor Vehicles (NYSDMV) database of all vehicles registered to New York City addresses in 2005. In order to gain a better understanding of the number of vehicles generated by residents of new housing, the study analyzed only personal motor vehicles registered to new housing (built since 1995) in Manhattan's Community Districts 9 through 12, and all of Queens, Brooklyn, and the Bronx. This subset represents approximately 1.46% of the total New York City (five borough) registrations in 2005. The study compared NYSDMV data with Census 1990 and 2000 SF1 and SF3 data, along with data from the 2006 American Community Survey, for time-series studies. Additional data included the New York City Department of Buildings (DOB) Final Certificate of Occupancy Filings to identify housing constructed since 1995.

Auto ownership data that is presented as an average for a Community District has limitations. The number of new residential buildings with ownership data varies widely between Community Districts throughout the city. For Community Districts with very few records, the statistic of median auto ownership should be interpreted cautiously. Such districts include Manhattan CDs 9 and 12, with 8 and 1 building records respectively; and Bronx CD 7, with 1 building record.

Data Analysis

There was a clear mismatch between census figures on automobile access and DMV data on car registrations, with census data indicating higher ownership than DMV data. The Census 2000 figures are based on the long form questionnaire asking, "*How many automobiles, vans, and trucks of one-ton capacity or less are kept at home for use by members of your household?*" As described and shown in Figure 1 below, NYS DMV vehicle registrations (the bars in blue) declined in all five boroughs between 2000 and 2006 despite an increase in housing development and population during the same period. Even if the rate of ownership – the number of cars per household – decreased, one would expect the aggregate numbers of car registrations to increase given recent population and housing growth. An analysis of the census data on access to automobiles, however, suggests different trends. Unlike the DMV data, the census shows an overall increase in auto ownership citywide, with large increases in the Bronx and Staten Island and small decreases in Brooklyn, Manhattan, and Queens. Despite the data mismatch, this study assumes that the access-to-automobiles data is analogous with the ownership data gained from the New York State DMV. Therefore, it is likely that a secondary factor is responsible for the discrepancy in auto data.

Figure 1: Comparison of DMV Auto Registrations and Census Vehicle Availability Data



Source: Census 2000 H041. Tenure by Vehicles Available; ACS 2006 B25044. Tenure by Vehicles Available; NYS DMV 2000 and 2006 Standard Series (Personal Auto) vehicle registrations

It is suspected that vehicle registrations are decreasing most significantly in boroughs where auto insurance rates are relatively high. Insurance rates are prohibitively high for many car owners who live within the city boundaries. Anecdotal evidence, backed by census data, hints towards a trend in city-residing car owners registering their cars at alternate addresses outside of the city, even though the cars remain parked and used primarily within the five boroughs. An inquiry in July 2008 into automobile insurance rates reveals lower insurance rates for cars in Dutchess and Nassau counties than rates for the same owner living in a neighboring borough. Table 1 highlights the findings.

Table 1: Comparison of Auto Insurance Premiums by select zip codes (Major insurer 6-month liability, collision and theft for a 2002 Honda Civic registered to a 30-year-old man with a good driving record and good credit)

Zip Code	Premium
11234 (Mill Basin, BK)	\$1,780
11317 (Flushing, QNS)	\$1,120
10461 (Pelham, BX)	\$1,110
10002 (East Village/LES, MN)	\$920
11735 (Farmingdale, Nassau)	\$880
11932 (Bridgehampton, Suffolk)	\$660
12569 (Dutchess County)	\$620
07961 (Morristown, NJ)	\$530
28206 (Charlotte, NC)	\$510
46256 (Indianapolis, IN)	\$470

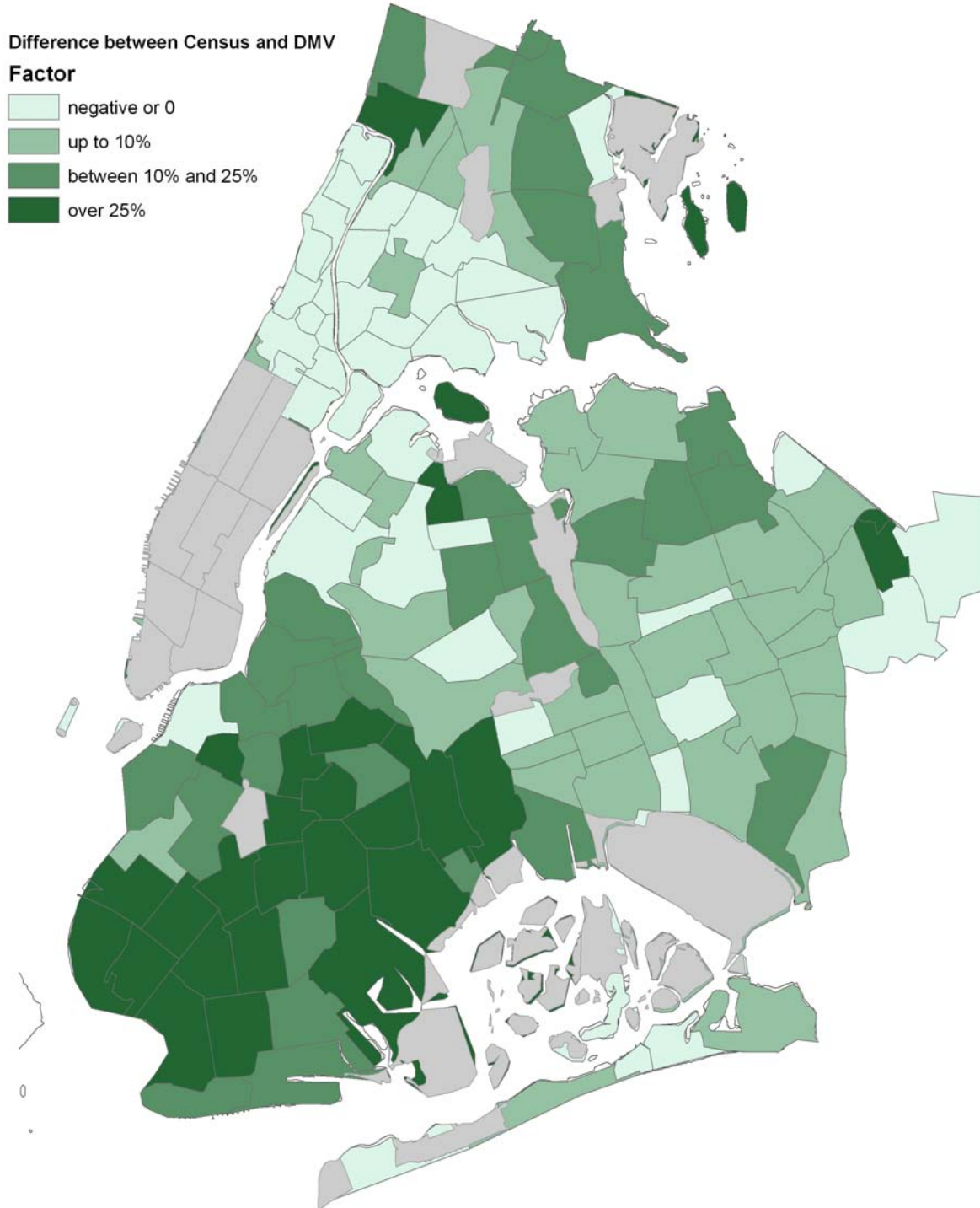
Source: Allstate Insurance

In areas with high auto insurance rates, car owners may employ strategies to register their cars at locations out of the city to reduce insurance costs. In order to account for this difference, the data were adjusted for consistency. Department of motor vehicle registrations were compared for all buildings by zip code to zip code-level census data on automobile access. Each record in the DMV database was inflated by the factor according to the census zip code record and, if the census rate of automobile access was higher, the record was inflated by the difference. No rate adjustment was applied for zip codes where the census reported fewer automobiles than the DMV. The maps in Figure 2 below show the adjustment factor range for each zip code.

Next, to understand patterns of car ownership across the city, trends were analyzed according to building type, location, proximity to public transportation, demographic characteristics, and zoning. In order to determine car ownership patterns of residents of new buildings, the DMV database was cross-referenced with DOB new construction completion files for housing built between 1995 and 2005. New building records with addresses that matched car registrations were selected. Once the final database was compiled, the car ownership data for each address were analyzed in a number of ways (by zoning district, required parking, building type, and location).

Figure 2: Difference between Census Access to a Vehicle and DMV Vehicle Registrations

Census to DMV Factor, by Zip Code Bronx, Brooklyn, Manhattan CD9-12, and Queens



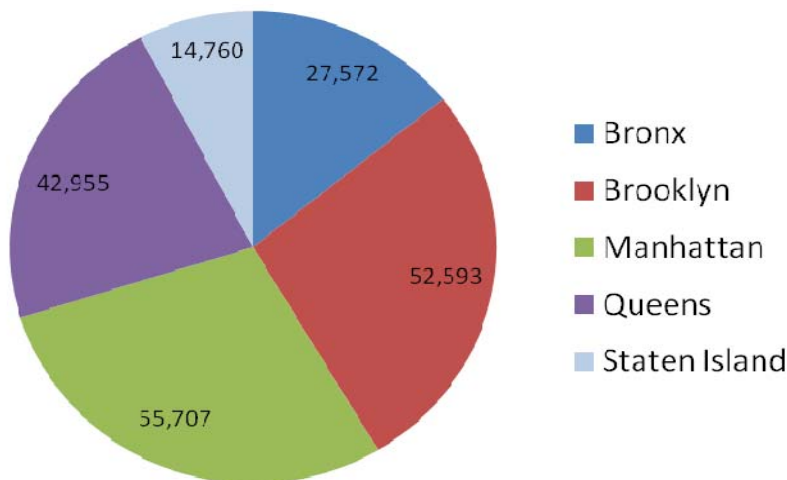
Source: U.S. Census 2000, NYS DMV, Dept. of City Planning

II. Population Growth & Housing Development

In the seven years from 2000 to 2007, New York City's population increased by an estimated 301,934 persons, over and above the record population of 8,008,278 recorded in the 2000 Census¹. This population increase has been facilitated by the highest levels of new housing construction since the early 1970s. From the beginning of 2000 through the end of 2007, 27,835 new residential units were issued permits in the Bronx, 51,975 in Brooklyn, 55,707 in Manhattan, 42,293 in Queens, and 15,801 in Staten Island – a total of 193,611 (Figure 3).

The availability of new housing and the underlying demographic trends behind the city's population growth – natural increase and immigration offsetting the outflow of population domestically – are expected to cause continued growth in the city's population in the next two decades. The Department of City Planning's projections indicate that the city's population will grow to 9.1 million by 2030 – an increase greater than 12% over the 8 million residents in 2000².

Figure 3: New Residential Unit Permits Issued by the Department of Buildings 2000-2007



Source: NYC Department of Buildings, new residential building permits, compiled by Department of City Planning

New York City's housing growth outpaced the region's in the years after 2005, reversing the decades-long dominance of the suburban housing market. Figure 4, below, shows that while New York City represents 38 percent of the region's total population, it accounted for only 12 percent of the region's new housing units in 1994³. By 2007, however, the number of housing units permitted for the year in New York City not only experienced a seven-fold increase over the 1994 level, but exceeded housing growth in the suburbs and represented over 56% of the

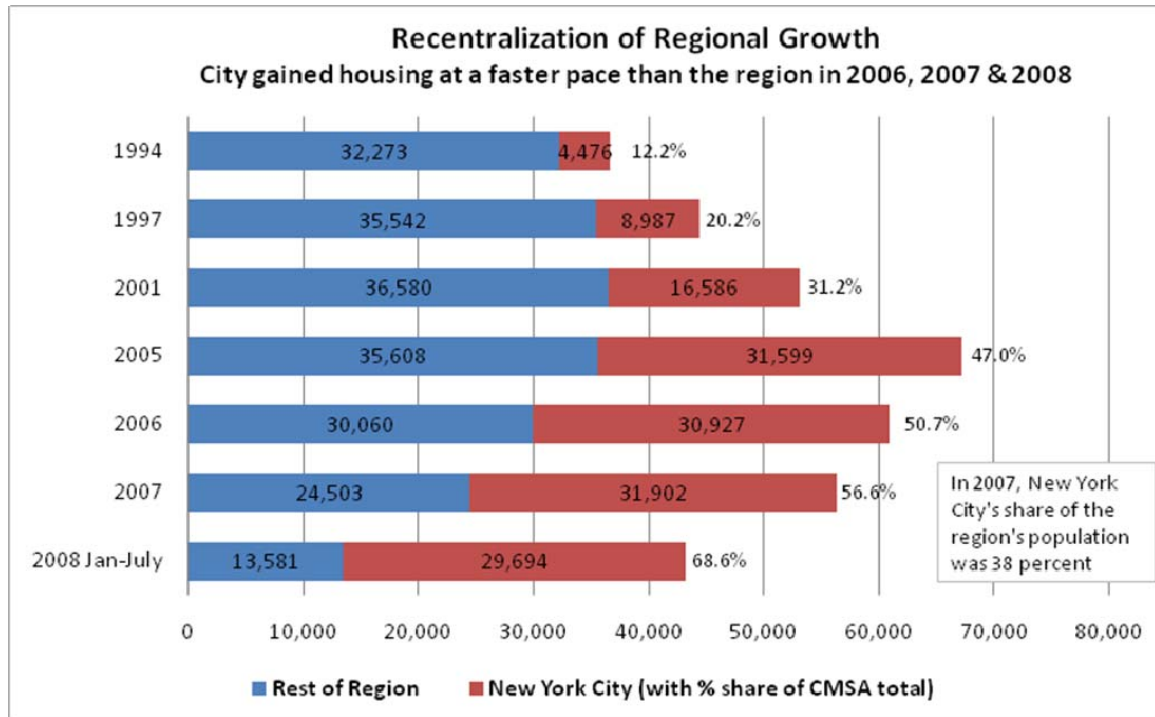
1 Department of City Planning, Population Division, Challenge to U.S. Census Bureau Estimate of July 1, 2007 Population, September 2008.

2 New York City Population Projections by Age/Sex and Borough, 2000-2030.
http://nyc.gov/html/dcp/html/census/2000_2030_popproj.shtml

3 The region is defined as the Consolidated Metropolitan Statistical Area, which includes the 5 counties of New York City and 25 suburban counties in New York, New Jersey, Pennsylvania and Connecticut.

region's new housing growth. Also, unlike the suburbs, New York City continued to show increases in the number of housing units permitted annually, suggesting a recentralization of housing growth. The reasons for this trend could include a renewed demand for urban living, immigration, and suburban land use policies that restrict the amount of new housing development. Regardless, the trend suggests that New York City is increasingly attracting households that might otherwise choose to live in the suburbs with a lifestyle that would be characterized by owning many more cars and driving many more miles.

Figure 4: Recentralization of Regional Growth: Housing Permits in the NYC CMSA, 1994-2008



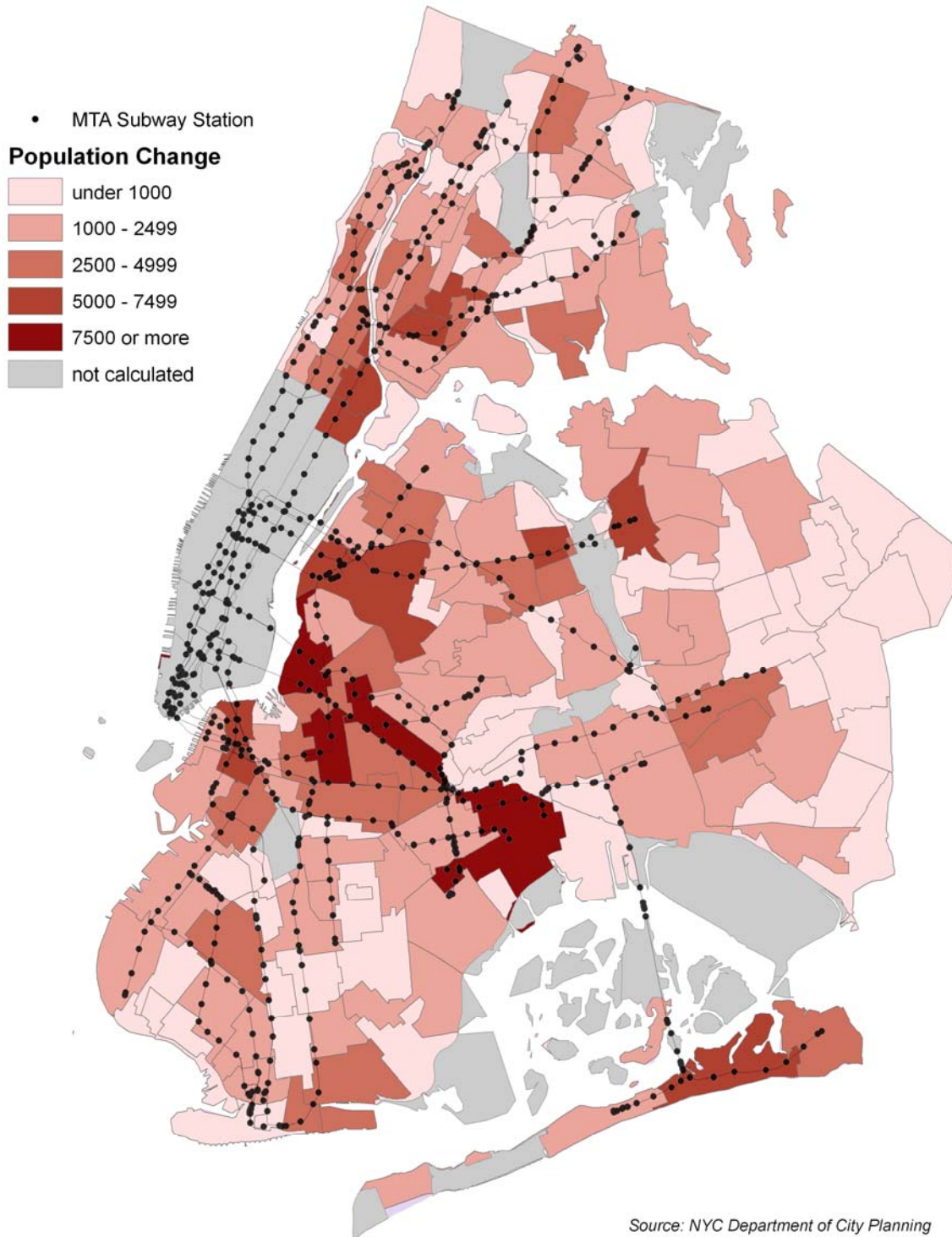
Source: U.S. Census Bureau Annual New Construction Statistics 1994-2008

At the same time that regional growth has been re-centralizing within the city, the city's land use policies have directed growth away from the city's auto-dependent fringes towards the more transit-accessible areas closer to the city's core. This trend is illustrated in Figure 5, below, which shows the Department's projection of 2000-2010 population growth by neighborhood, prepared for the PlaNYC 2030 study in the spring of 2007⁴. The city's transit grid is overlaid on this map to indicate transit accessibility of each area.

Figure 5 indicates that the decade's population growth is concentrated in transit-accessible areas. Much of the growth in outlying areas of the city, such as eastern Queens, occurred earlier in the decade prior to zoning changes that redirected growth.

⁴ Source: NYC Department of City Planning, Population Division, Projected Population Change by Neighborhood, New York City, 2000-2010. http://nyc.gov/html/dcp/pdf/census/pop_change_neigh.pdf

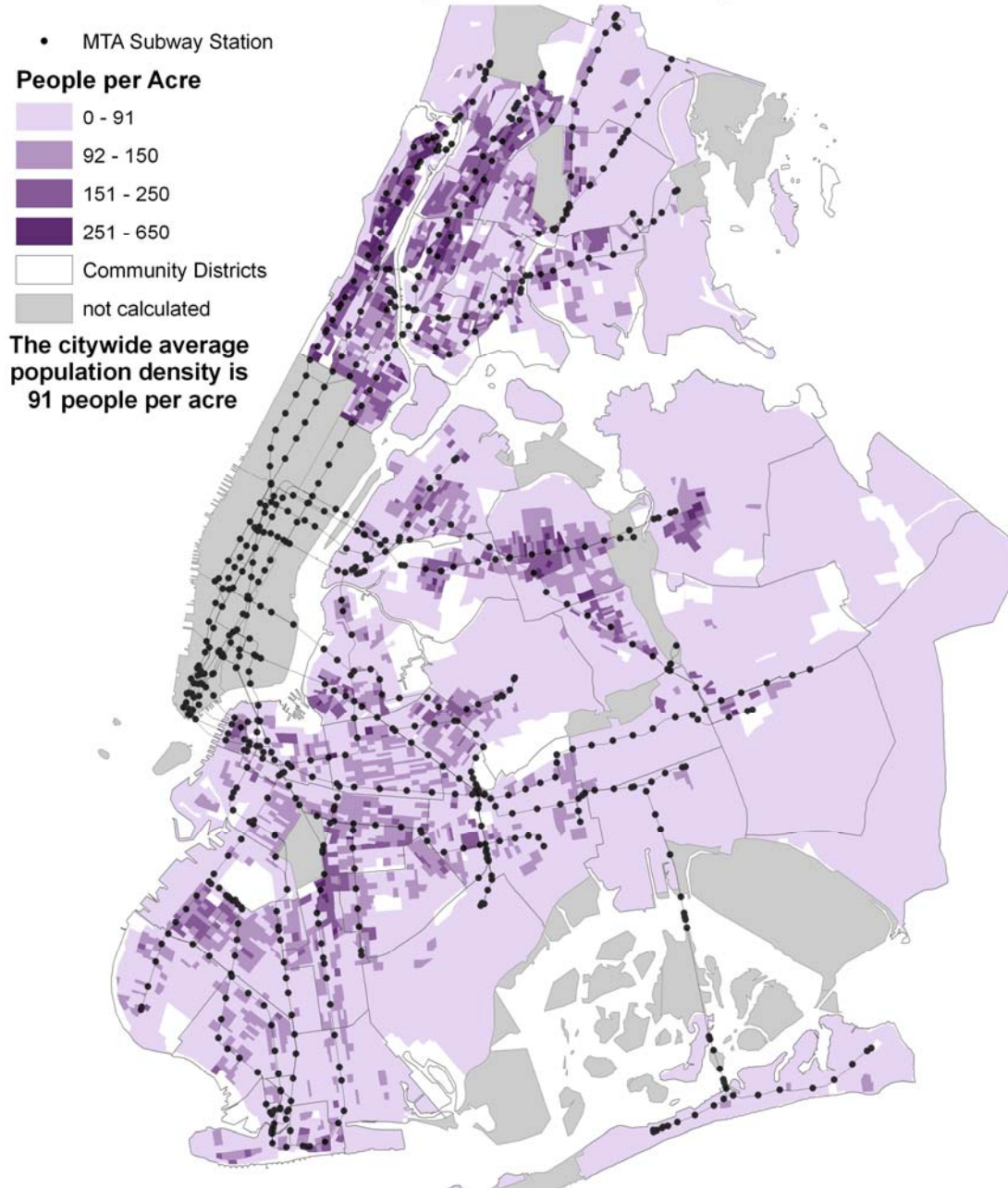
Figure 5: Subway Access and Projected Population Change by Neighborhood 2000-2010



Source: NYC Department of City Planning, Population Division, Projected Population Change by Neighborhood, New York City, 2000-2010. http://nyc.gov/html/dcp/pdf/census/pop_change_neigh.pdf

One consequence of the city's policy of redirecting growth to transit-accessible areas is that, to the extent that new residents have cars, they are searching for parking in areas that are already very dense and where on-street parking is already heavily used. The map in Figure 6 shows the 2000 Census population density in the city's transit corridors. Population density is greatest in those areas close to transit.

Figure 6: Population Density and Proximity to Transit



Source: US Census 2000, NYC Department of City Planning

Prior to 1938, parking was prohibited within residential buildings, and R6 and higher districts are characterized by mid- to high-density multifamily housing in which little open space was available to locate free-standing garages. Figure 7 shows the distribution of housing developed before 1938, in R6 (mid-density) and higher-density zoning districts. As shown in the map, the pre-1938 multifamily housing is concentrated in the same areas where transit is accessible, population densities are high, and the city’s planning policies have redirected growth. When new housing is built and new residents choose to own cars, they are competing for limited on-street parking with existing residents for whom off-street parking is not provided.

Figure 7: Housing Built Before 1938, R6 and Higher Zoning Districts



Source: NYC Department of City Planning PLUTO data

III. History of New York City Parking Requirements Affecting the Study Area

New York City first permitted parking for the private automobile within new residential buildings in 1938. Prior to that time, residential parking was permitted only in free-standing structures such as the rear garages found in many older small homes. Twelve years later, in 1950, residential parking requirements were enacted for the first time.

In comments made regarding the 1950 zoning amendment, covering *Parking Facilities for Dwellings*, City Planning Commission (CPC) Chairman Jerry Finkelstein noted the Commission's awareness of the "growing congestion in our City" and stated the policy of the CPC is and will continue to be to "get parked cars off the City's streets" (pg. 522-523, *City Planning Commission Report*, June 21, 1950).

Still, the policy was not without opposition. A *New York Times* article dated July 21, 1950 noted opposition from the spokesmen for the Brooklyn and Queens real estate boards who feared that residential parking requirements would "discourage the construction of apartment houses and one and two-family houses." These conflicting priorities have continued to echo through the years of debate on this subject.

1961 Zoning Resolution

Residential parking requirements were increased with the citywide zoning revision of 1961. The *Zoning New York City* pre-revision analysis, prepared for the City Planning Commission by consultants Voorhees, Walker, Smith & Smith and dated August 12, 1958, noted: "the proposed zoning accepts the existence of the automobile" and requires that "off-street parking be provided in all residential districts...except for the most congested downtown areas where mandatory off-street parking would be uneconomic and impractical" (pg. vii). This rationale forms the basis for the 1961 zoning change proposal with regard to residential parking. The report continues: "In Residence Districts appreciably higher parking requirements are proposed than in the present resolution, in recognition of the clear-cut trends in both automobile ownership and the voluntary provision of off-street parking spaces by most post-World War II residential developers. . . The flexibility required to obtain adequate parking facilities where needed without penalizing the areas and uses with low parking needs is obtained by establishing parking levels which vary by district depending on location and by the traffic-generating characteristics of the various types of uses" (pg. x).

According to the report, "higher [residential] parking requirements are established in line with recent substantial increases in automobile ownership and utilization, particularly among those persons who will be living in the new private housing of all types to which these requirements will apply" (pg. 85). These regulations were set with three major purposes: "1) to prevent the saturation of streets in the developing low-density residential areas with cars parked on the street; 2) to encourage and require more off-street parking in medium- and high-density areas to help relieve the pressure on the streets for parking; 3) to insure that parking facilities in all residential

areas meet adequate design standards in order not to endanger the residential character of the neighborhood” (pg. 85).

1973 Infill Zoning

As construction costs increased and opportunities for new development on vacant land diminished through the 1960s, the city turned to existing small lots as a resource for building and renovation. Infill zoning allowed for enlargements of existing houses in low-density areas (R4 and R5). Three-family houses were made compliant with zoning on relatively small lots, subject to height limits. Parking requirements were reduced in R4 and R5 zones from 1.00 and 0.85, respectively, to 0.66 spaces per unit, since the number of permitted dwelling units in the building was increased from two to three. This was viewed as more consistent with ownership rates at the time (*Infill Zoning*, Department of City Planning, January 1972).

1987 Establishment of the Quality Housing Program

With the establishment of the Quality Housing program in 1987, the City Planning Commission reduced the parking requirements for “Quality Housing” developments in R6 and R7 districts (See Glossary for definition). Where parking had previously been at 0.7 and 0.6 spaces per dwelling unit for R6 and R7-1 districts, respectively, the number of spaces required was reduced to 0.5 spaces per dwelling unit.

Quality Housing was designed to address out-of-character residential development and a “long-term dearth of housing production” (*City Planning Commission Report*, June 17, 1987, Calendar No. 78). It sought to “encourage the production of multi family housing, particularly in medium density districts, while maintaining the existing scale of buildings and quality of life in affected neighborhoods” (pg. 5).

The Quality Housing proposal was reviewed by Community Board representatives, community members and elected officials. Several concerns were raised, particularly over the modification to parking requirements. In addition to reducing the requirements, and allowing for waivers, accessory off-street parking spaces pursuant to the Quality Housing program are required to be completely enclosed or screened from residential units, adjacent zoning lots, and streets.

Opposition to both the reduced requirements and the additional burden of enclosure and screening were raised. At the Community Board public hearings, a major concern was that in Brooklyn, Queens and Staten Island a 50 percent parking requirement was inadequate (pg. 19). The Queens Borough Board recommended that “the proposal be adopted... with parking requirements based on automobile ownership and proximity to mass transit” (pg. 20). Others argued that “the cost of covered parking, necessitated by a parking requirement and high coverage buildings, would substantially raise construction costs and reduce housing production” (pg. 21) and a similar concern suggested that “small sites require waivers and modifications of the parking requirement because of the difficulties of providing a ramp and the required parking on one level” (pg. 22).

The Commission acknowledged the tension between requiring adequate parking space and allowing for appropriate building construction and design cost. As a result, revisions were made to the Quality Housing program: “In R6 and R7 districts the proposed 50 percent parking requirement generally coincides with the amount of parking that can be provided economically on one level of enclosed parking. To facilitate the provision of additional parking where feasible, the program has been revised to permit uncovered, on-grade parking on that portion of the development site remaining after the planting and recreation space requirements are met. Any such parking would have to be screened from on-site apartments, adjacent properties, and the street. The current Zoning Resolution regulations recognize the difficulty of satisfying the parking requirements on small zoning lots and permits modifications or waivers on such lots. The Commission modified the proposal to make these provisions applicable to most Quality Housing developments” (pg. 36-38).

1995 - Long Island City Parking Requirements Removed

In October 1995, parking regulations in Long Island City, Queens were reduced to resemble those in Manhattan’s core – effectively eliminating residential parking requirements for new construction. The basis for this modification was concern among the community and elected officials that, as Long Island City evolved from a primarily industrial to largely residential and commercial neighborhood, traffic congestion caused by Manhattan-bound commuters using either the Queensboro Bridge or Queens-Midtown Tunnel would worsen.

The 1990 Final Environmental Impact Statement (FEIS) for the Hunters Point Waterfront Project recommended imposing “restrictive parking regulations in Long Island City to discourage commuters and other auto users from driving to Long Island City and encourage them to use mass transit instead.” As the Zoning Resolution of 1961 required more significant off-street parking for new residential development, such restrictive regulations would be necessary to limit congestion caused by automobile traffic generated by new residences and businesses.

The zoning text of 1995 limited the amount of accessory parking that could be provided for any type of development. Off-street parking spaces cannot exceed 50 percent of the dwelling units contained in the development or enlargement, or 200 spaces, whichever is less, within an area of about six blocks. Within the remaining portion of the subject area, the number of accessory off-street parking spaces cannot exceed 100 percent of the dwelling units contained in the development or enlargement (see map in Appendix C).

IV. Current Requirements

Citywide, parking requirements generally align with three density classifications (see Table 2 for a summary). The lowest density districts require one space per unit, with higher requirements in “growth management areas.” Mid-density developments require between 0.5 and 0.85 spaces per unit, while the densest require between zero and 0.4 spaces per unit, depending on the size of the development site and applicability of waivers. There is no parking requirement for Manhattan Community Districts 1 through 8 or Long Island City.

Table 2:

Summary of New York City Residential Parking Requirements		
<i>Zoning District</i>	<i>Parking Requirement</i>	<i>Waiver Allowed</i>
Low Density (R1-R4*)	1.00	no
Mid Density (R4 “infill”, R5-R7)	0.50 - 0.85	yes**
High Density (R8 - R10)	0.40 - 0.50	yes

* except R4 “infill”

** except R4 “infill” and R5 “infill”, R5 and R5A

Waivers & Subdivisions:

Although parking is nominally required, it is possible to waive the requirements for many types of residential construction. The waivers were created to address challenges to accommodating parking on small sites, thereby avoiding a situation where developers might be forced to reduce the number of units, seek a variance, or abandon a project if parking were required. However, developers are generally not prohibited from creating a small lot condition by subdividing the lot, thereby waiving out the parking. As a result, many developments provide little or no off-street parking for residents, despite the requirement.

For instance, in high- and mid-density districts, developers building on small lots are permitted to waive required parking if the required parking for a building, which is based on a percentage of units, is less than or equal to the designated waiver. For example, on land zoned R6, a widely mapped, mid-density apartment building district, a developer is required to provide one space for every two dwelling units – a 50 percent requirement. This parking requirement may be waived, however, if the development yields five or fewer required parking spaces. Therefore, up to 10 dwelling units could be built on the site, generating only five required parking spaces and the developer is not required to construct those parking spaces.

There are no rules that currently prohibit developers from creating the small sites that trigger waivers. As a result of this ability to waive out, many developers have realized an incentive to subdivide larger lots into smaller ones in an effort to avoid providing required parking. By subdividing a large lot and then building the same number of originally-intended units across a series of smaller lots, the waiver threshold is more easily met. For example, as shown in Figure 8 in a photo

Figure 8: Recent R7X Development Using Waivers



of two newly constructed apartment buildings in an R7X district in Astoria, Queens, a 98-unit building could have been constructed on a 20,000 sq. ft. lot, generating a requirement of 49 parking spaces (with no possibility of waiving the 0.5 spaces per unit parking requirement). However, the developer chose instead to subdivide the 20,000 sq. ft. lot into two 10,000 sq. ft. lots with two buildings, each with 48 dwelling units. For lots of 10,000 sq. ft. or less, the parking requirement in R7X is reduced to 0.30 spaces per unit, generating a requirement of 14 spaces in each building. Since this is less than the 15-space waiver in R7X districts the developer can achieve the same number of intended units (98) while waiving out of any required parking.

In the case of an R6 development in Olinville in the Bronx (shown in Figure 9), a developer subdivided a site into three separate zoning lots with three, 8-unit buildings, each of which waived out of the 0.50 spaces per unit parking requirement under the five space waiver in R6 zoning districts. As one building, the parking required would be 12 spaces, and no waiver applies.

In total, 3267 buildings out of the 7993 buildings analyzed qualified for a parking waiver. A detailed table of Zoning Resolution parking requirements and waivers is located in Appendix A.

Figure 9: Recent R6 Development Using Waiver



V. Study Findings

This study has arrived at five findings that will contribute to the city's base of knowledge in its efforts to develop appropriate regulations establishing required parking for new residential developments.

Finding One: Ownership patterns vary by age of housing, location, and building type

The study explored a number of key factors to determine the relationship between rates of auto ownership and the built environment, such as zoning, parking requirements, housing density, age of housing, and location. In analyzing the data, three factors displayed consistent patterns, including age of housing, location, and building type. An explanation of the research and findings follows.

a. Age of housing:

A comparison of the city's overall housing stock to the new housing stock analyzed in this study (permits issued between 1995 and 2005) showed a significantly higher number of cars per household in the new housing. As demonstrated in Figures 10 and 11 below, housing built from 1995 to 2005 generated a higher number of vehicle registrations per dwelling unit than older housing. The maps show the per unit vehicle registrations by community board for all housing, with shades of grey increasing in darkness for increasing rates of per unit auto ownership. When all housing is analyzed, in 26 of the city's 48 community districts included in the study, the average number of cars per household is less than 0.5 spaces per unit. Indeed, for all housing, only three of these community districts in the far eastern portions of Queens have ownership rates that exceed an average of one car for every household.

By contrast, when isolated to show just car ownership among households living in newly constructed buildings, the pattern changes noticeably. The number of community districts with an average of 0.5 or fewer cars per unit drops to nine from 26 for all buildings, while the number of districts exceeding an average of one car per unit increased to 11 from three for all housing. This could be driven by a number of factors: first, newer housing is likely to cost more than older housing and thus occupants are more likely to have high incomes. Data show that more affluent households are more likely to own an automobile (see Figure 18 on page 42). Second, much of the city's older housing stock was developed within close proximity to mass transit at a time when most households did not own cars and developments provided little or no parking. Households whose lifestyle preferences do not include car ownership may be more likely to choose to live in this type of housing.

Figure 10: Cars in All Existing Housing

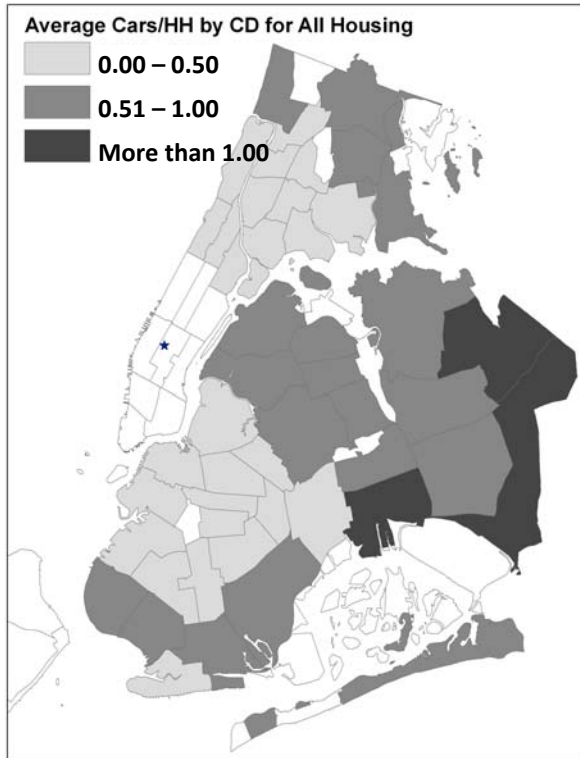
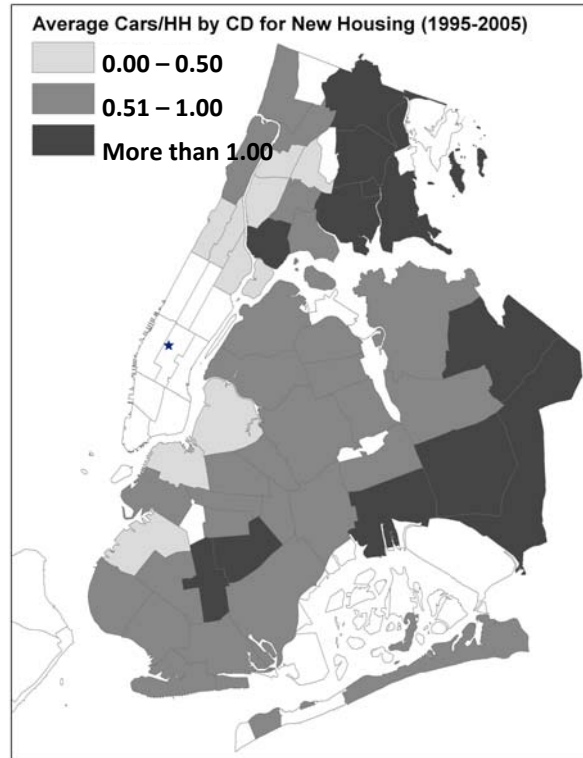


Figure 11: Cars in New Housing



Source: Standard Series Vehicle Registrations in Force, 2005 compiled by DCP; NYC Department of Buildings, New Residential Building Permits, compiled by DCP, US Census, American Community Survey 2005

Table 3: Comparing Average Cars per Housing Unit for New Housing and All Housing in the Bronx, Queens, and Brooklyn*, 2005

	Average Cars per Housing Unit	Total Residential Units
New Housing in Bronx, Brooklyn, Queens	0.81	31,731
All Housing in Bronx, Brooklyn, Queens**	0.59	2,132,899

*Northern Manhattan excluded due to extremely low numbers of cars registered to new housing units

**Average Cars per Housing Unit for All Housing based only on DMV car registration data and is not adjusted to account for Census data reporting access to cars.

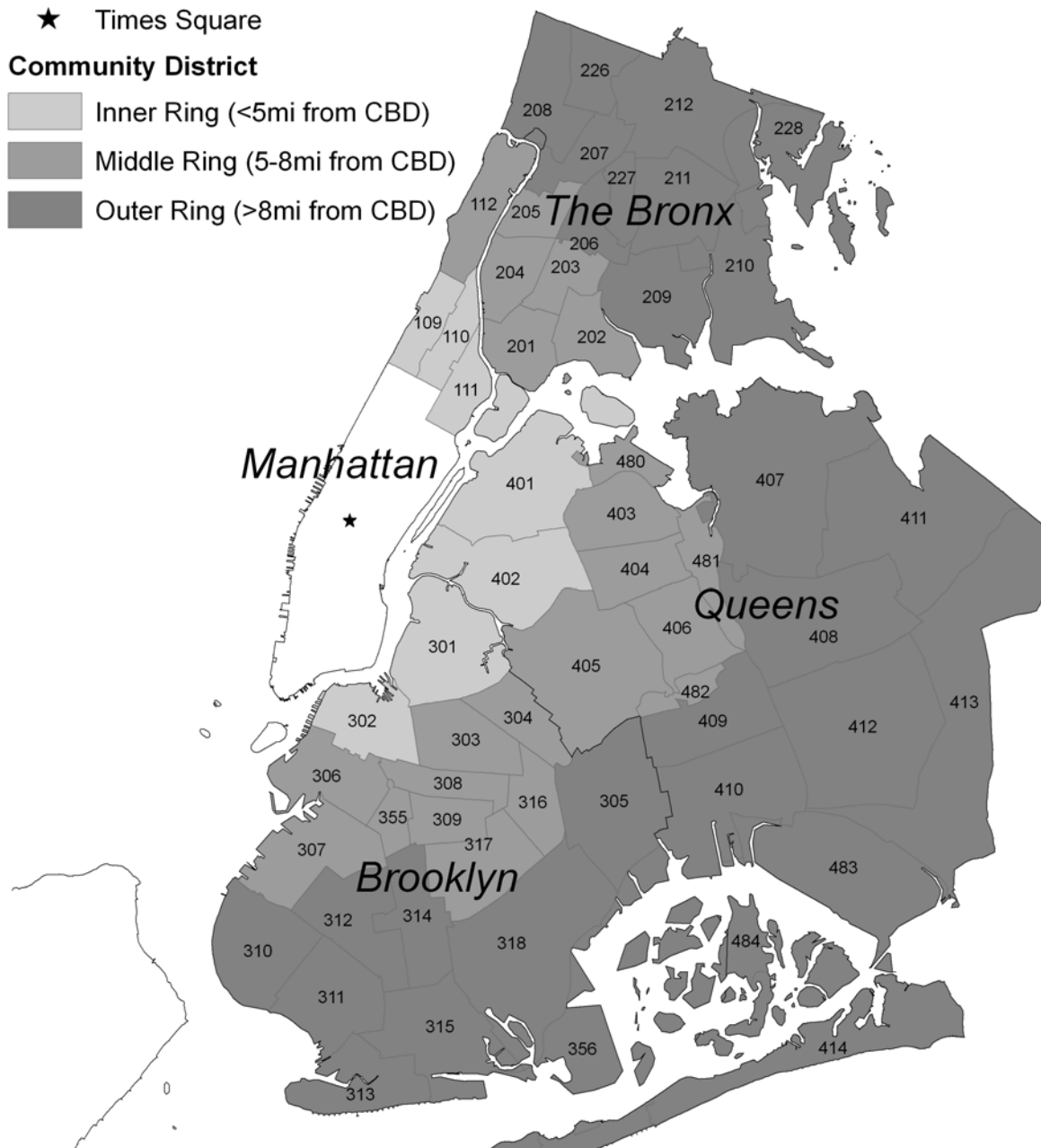
Source: Standard Series Vehicle Registrations in Force, 2005 compiled by DCP; NYC Department of Buildings, New Residential Building Permits, compiled by DCP, US Census, American Community Survey 2005

b. Location:

To determine the relationship between location and car ownership in New York City, the DMV data were analyzed based on specified distances from Manhattan’s Central Business District. The CDs were first grouped into one of three categories determined by a specified distance from Manhattan’s Central Business District, with Times Square as the epicenter. The categories, shown below in Figure 12, include CDs with more than half of their area within five miles of

Times Square (Inner Ring), within five to eight miles of Times Square (Middle Ring) and greater than eight miles from Times Square (Outer Ring).

Figure: 12 Geographic Categories by Community District as Determined by Distance from Manhattan CBD (Times Square)



Source: NYC Department of City Planning

The DMV data were then analyzed based on these three geographical categories – inner, middle, and outer ring. As shown below in Table 4, the average number of cars per unit increases as one moves away from the Central Business District, indicating a direct relationship between distance

from Manhattan CBD and car ownership. In the inner ring, cars were registered to an average of approximately 41 percent of new housing units built between 1995 and 2005, compared to an average of 74 percent of housing units in the middle ring and nearly one car per new housing unit in the outer ring.

**Table 4:
Average Cars per Housing Unit by Location, New Housing**

Location	Average Cars per Housing Unit	Total New Residential Units	Total New Residential Buildings
Inner Ring	0.41	6,700	868
Middle Ring	0.74	7,803	2,207
Outer Ring	0.92	17,228	4,918
Grand Total	0.77	31,731	7,993

Source: NYS Department of Motor Vehicles, Standard Series Vehicle Registrations in Force, 2005 compiled by DCP; NYC Department of Buildings, New Residential Building Permits, compiled by DCP

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Source: NYS Department of Motor Vehicles, Standard Series Vehicle Registrations in Force, 2005 compiled by DCP; NYC Department of Buildings, New Residential Building Permits, compiled by DCP

For all housing units in the Bronx, Brooklyn and Queens, there are 0.59 registered cars per housing unit. For new housing in these boroughs, the average increases to 0.81.

c. Building Type:

In addition to location, density of housing is also a determinant of auto ownership. Typically, as density increases, rates of auto ownership tend to decrease. This study identified building type as a primary factor in predicting auto ownership. Table 5 isolates building type (as defined by the number of residential units in the building) categories of one- and two- family, three- and four-family, and multi family buildings (more than five units). These housing types generally align with three distinct markets for housing which are typical in New York City – single-family homes and townhouses; lower-density walk-up apartment houses and infill development; and mid- to high-density apartment buildings. The data demonstrate the difference in vehicle registrations per household when isolated by the three different building types.

**Table 5:
Average Cars per Housing Units by Housing Type, New Housing**

Building Type	Average Cars per Unit	Total New Units	Total New Buildings
One- and Two-Family	1.33	9,498	5,463
Three- and Four-Family	0.79	6,024	1,886
Multifamily (5 or more)	0.44	16,209	644
Grand Total	0.77	31,731	7,993

Standard Series Vehicle Registrations in Force, 2005 compiled by DCP; NYC Department of Buildings, New Residential Building Permits, compiled by DCP

By isolating building type categories, one can see the impact of housing density on auto ownership. Though this breakdown disregards other factors that influence car ownership, such as income, family type and housing tenure (whether a household is occupied by renters or owners), it offers insight into the number of cars generated by a new development. One- and two-family buildings show the greatest auto generation with an average of 1.33 cars per household, while the typical multi family (five or more units) building generates a third as many cars with an average of 0.44 cars per household. The relationship between car ownership and density of housing (units per building), therefore, is inversely related, with the number of cars per household increasing as housing density decreases.

d. Location & Building Type

Having identified the strong impacts of both location and building type on auto ownership, ownership data were further parsed in order to demonstrate the combined impacts of these two factors. Table 6, below, displays typical auto generation for buildings based on building type and location – in this case, proximity to the Manhattan central business district. Within each area, the average registrations per household are displayed according to one of nine categories determined by a combination of building type and location categories. This table shows that within each category the number of registrations per household increases as building size decreases, and that, holding building type constant, the registrations per household increase as one moves further from the Manhattan CBD. Therefore, auto ownership per household unit can be observed to increase with distance to the CBD and decrease as the number of units in a building increases. This analysis suggests that a more accurate depiction of auto ownership trends looks at both housing type and location together rather than in isolation. It also reveals a wide variation in auto ownership rates within the three typologies depending on the location of the building, underscoring the importance of considering both factors when trying to understand patterns of auto ownership in New York City. For instance, a family living in a two-family building in downtown Brooklyn, an inner ring location, would be more likely to own a car than a family living in an apartment building in the same neighborhood, but less likely to own a car than a family living in a two-family building in Bay Ridge, an outer ring Brooklyn neighborhood.

**Table 6:
Average Cars per Household by Housing Type and Location, New Housing**

Category	Average Cars per Household	Total New Units	Total New Buildings
Inner Ring, 1&2 Family	1.03	509	260
Inner Ring, 3&4 Family	0.66	1,396	452
Inner Ring, Multifamily	0.27	4,795	156
Middle Ring, 1&2 Family	1.11	2,717	1,457
Middle Ring, 3&4 Family	0.74	1,842	582
Middle Ring, Multifamily	0.44	3,244	168
Outer Ring, 1&2 Family	1.45	6,272	3,746
Outer Ring, 3&4 Family	0.89	2,786	852
Outer Ring, Multifamily	0.53	8,170	320
Grand Total	0.77	31,731	7,993

Standard Series Vehicle Registrations in Force, 2005 compiled by DCP; NYC Department of Buildings, New Residential Building Permits, compiled by DCP

Finding Two: Current requirements frequently do not reflect ownership patterns, suggesting that parking requirements may fall short of demand in some parts of the city and exceed demand in others

This section provides an analysis of the DMV car registration data in the context of parking requirements. An analysis using GIS mapping software revealed that in many cases, requirements do not reflect actual ownership patterns, and that in many parts of the city required parking falls short of demand, while in others it may be higher.

Required Parking Compared with Vehicle Ownership

In order to assess the relationship between parking requirements and the off-street parking demand of residents of new housing, the DMV data were mapped and compared with the zoning requirements for each district, taking into consideration sites eligible for small lot reductions and waivers. The study assumed buildings waived out of providing parking when permitted to do so through zoning (see Appendix A for parking requirements) and identified areas throughout the city that demonstrated the highest imbalance between parking requirements and parking demand in newer housing.

Figures 13 through 16, below, display both the location and the potential parking requirement deficit or surplus per unit of individual new buildings based on the difference between registered autos and required parking – showing the extent to which individual residential buildings align

with existing parking requirements. Figure 13 shows the parking deficit or surplus for all new housing, regardless of housing type, while Figures 14 through 16 display the data separately by building type – demonstrating that the relationship between requirements and parking demand varies not only by location, but also by density of housing.

Data points on the left-side maps represent a new building where the parking requirements are less than the number of registered cars per unit. Data points on the right-side maps have parking requirements equal to or above the registered autos of a building's occupants, and indicate locations where parking requirements meet demand.

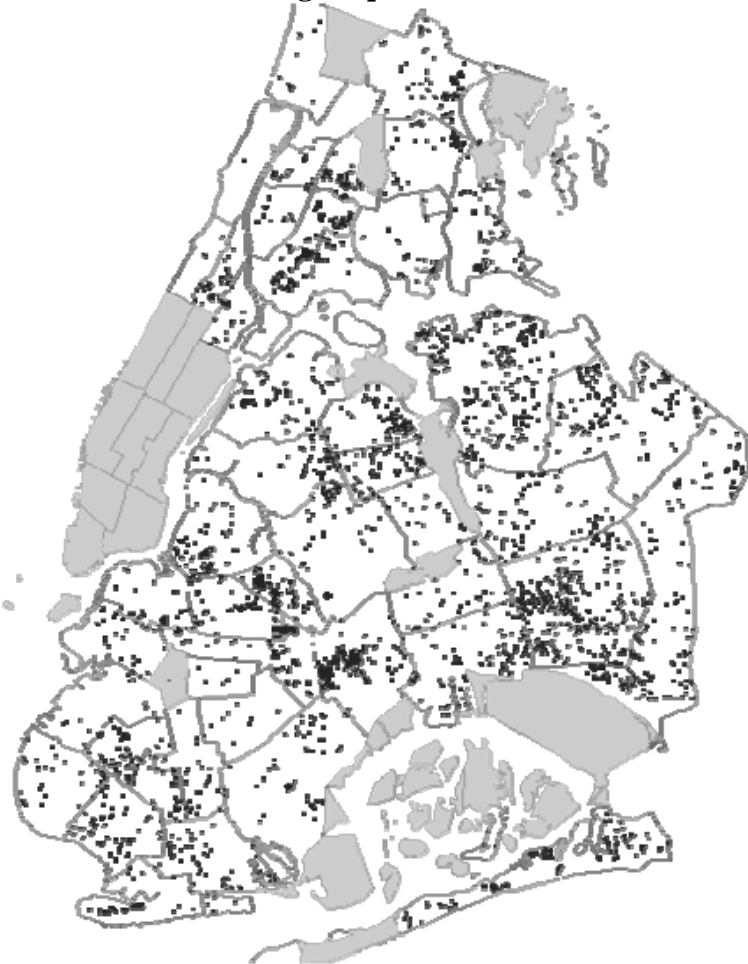
It is important to recognize that Figures 13 through 16 compare registered autos to the amount of parking required, given waivers where eligible, rather than to actual parking spaces provided. Builders may elect to include a greater number of parking spaces than is required by the Zoning Resolution. The figures do not necessarily reflect the actual off-street parking available.

The ownership patterns show that when both the underlying requirements and eligibility for waivers are considered, many developments are required to provide less parking than the current levels of ownership. The data suggest that in many neighborhoods, residents of new housing increase the demand for on-street parking. This exacerbates existing heavy utilization of such parking possibly resulting in congestion and vehicular emissions as cars cruise the neighborhood in search of parking, and prompts requests by community groups and elected officials for increased parking requirements.

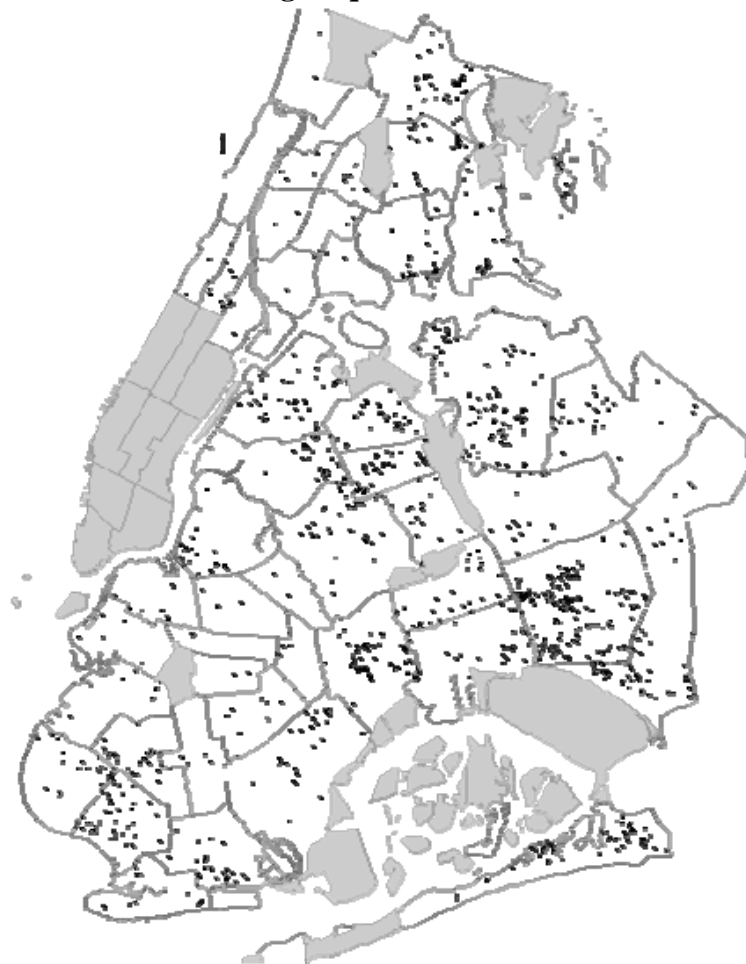
Figure 13 below depicts parking demand and requirements for all new housing.

Figure 13: All New Housing

Cars Exceed the Parking Requirement



Parking Requirements Meet or Exceed Demand

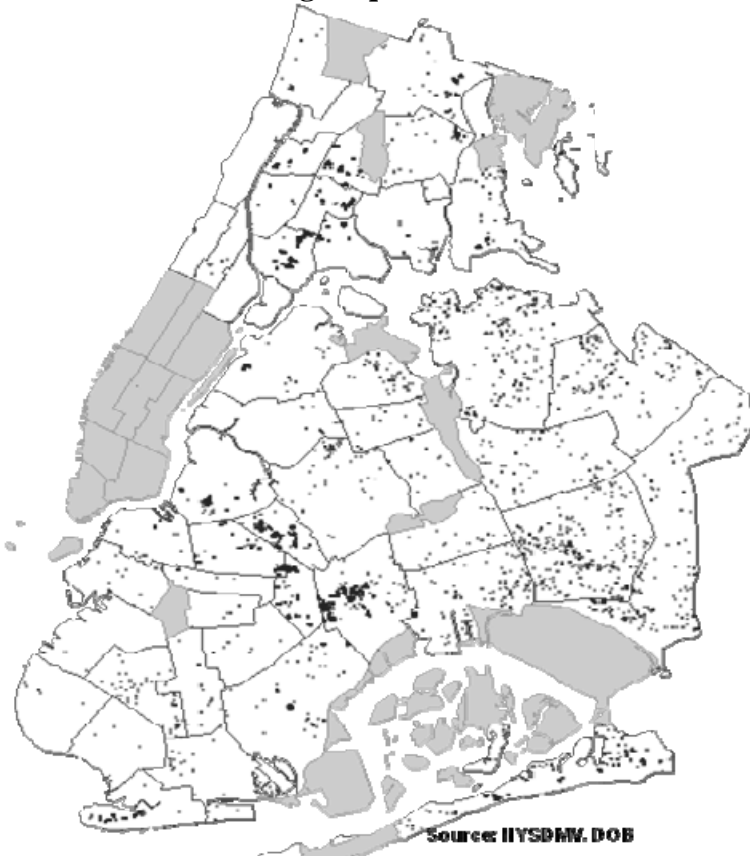


Source: NYS Department of Motor Vehicles, Standard Series Vehicle Registrations in Force, 2005 compiled by Department of City Planning; NYC Department of Buildings, New Residential Building Permits, compiled by Department of City Planning

Figure 14 displays the gap between required parking and car ownership one and two-family homes, revealing frequent shortfalls in parking in most parts of the city, and in greater frequency in the areas most distant from transit and the Manhattan CBD. The black dots increase in frequency as distance from the Manhattan CBD increases, reflecting the locations where such housing is most likely to be built.

Figure 14: One- and Two-Unit Buildings

Cars Exceed the Parking Requirement



Parking Requirements Meet or Exceed Demand

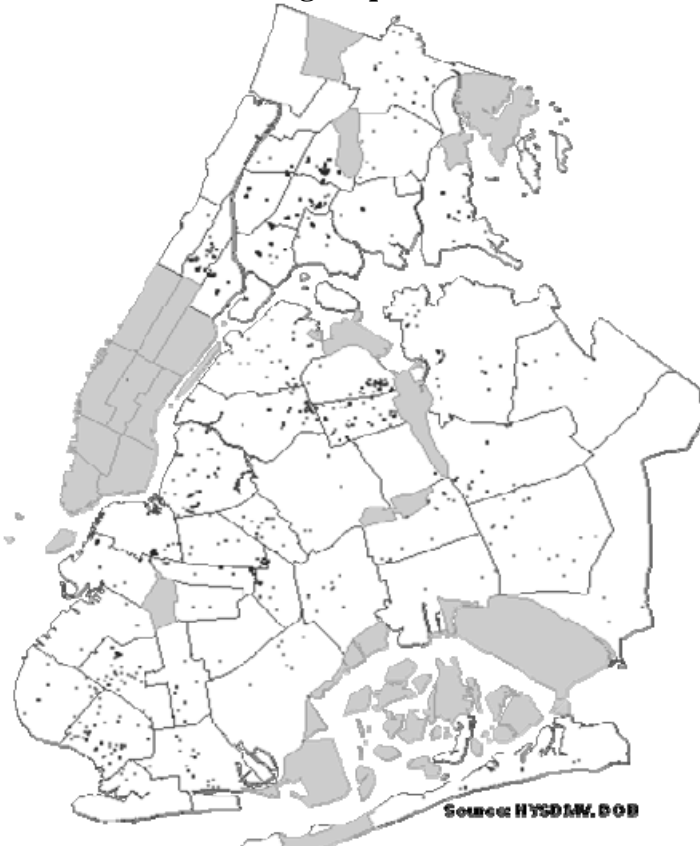


Source: NYS Department of Motor Vehicle Registrations in Force, 2005 compiled by Department of City Planning; NYC Department of Buildings, New Residential Building Permits, compiled by Department of City Planning

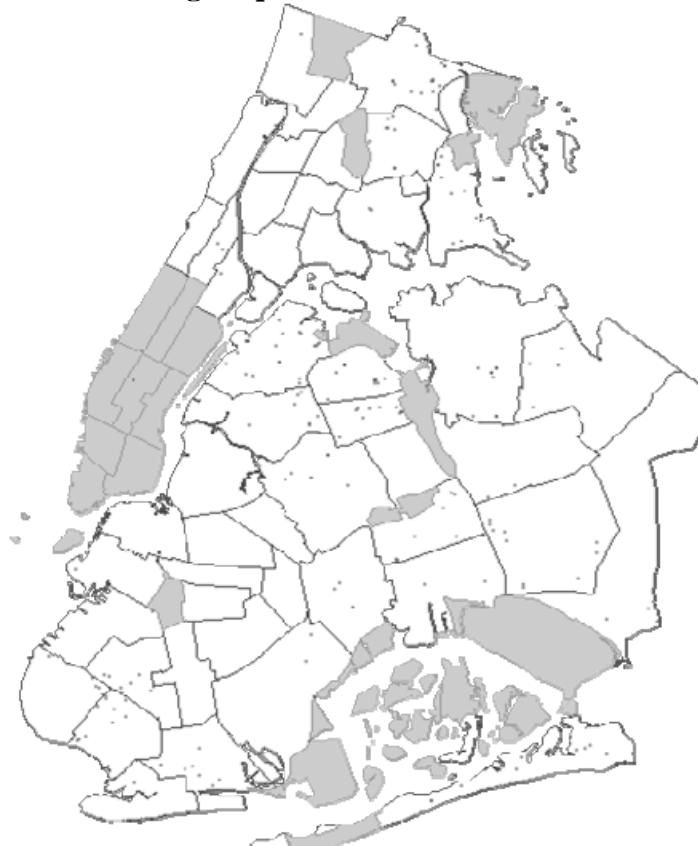
The surplus and deficit maps for three- and four-family and multifamily homes, however, reveal a different picture. Figures 15 and 16 show that, in contrast to one- and two-family homes, which exhibited parking shortfalls throughout all parts of the city, for three- and four-family homes the potential shortfalls in parking demand are clustered in certain areas, again reflecting the locations with zoned densities most likely to produce this type of housing.

Figure 15: Three- and Four-Unit Buildings

Cars Exceed the Parking Requirement



Parking Requirements Meet or Exceed Demand



Source: NYS Department of Motor Vehicles, [Vehicle Registrations in Force, 2005](#) compiled by Department of City Planning; NYC Department of Buildings, [New Residential Building Permits](#), compiled by Department of City Planning

For multifamily buildings (Figure 16), the total number of data points (buildings) is lower, but each point represents more individual units. The quantity of multi family buildings that do and do not meet demand is about even. As shown in Table 6, the average number of cars per dwelling unit for buildings with five or more units, at 0.27 in the inner ring and 0.44 in the middle ring of community districts surrounding the Manhattan core, is lower than the underlying parking requirements in the applicable medium-density zoning districts, where small-lot reductions and waivers do not apply. However, the presence of publicly-assisted housing in this sample, particularly in upper Manhattan, the south Bronx and northern and central Brooklyn, likely overstates this disparity. Much of this housing is occupied by low-income households that are less likely to own cars.

Parking requirements for certain types of publicly-assisted housing are lower than for other housing, though these lower rates were not applied to the mapped points seen below – rather, requirements and waivers were determined based on general zoning requirements because a detailed study of the public programs utilized and income groups targeted was beyond the scope of this study. As a result, some of the dots that represent buildings where the parking requirement meets or exceeds demand may actually have been built pursuant to the lower parking requirements for publicly-assisted housing.

Additionally, the presence of low-income residents in the calculations estimating average cars per household likely lowered the average rates of car ownership among multi family unit dwellers in new housing. This issue needs to be analyzed further and is identified as a necessary follow-up study in this report

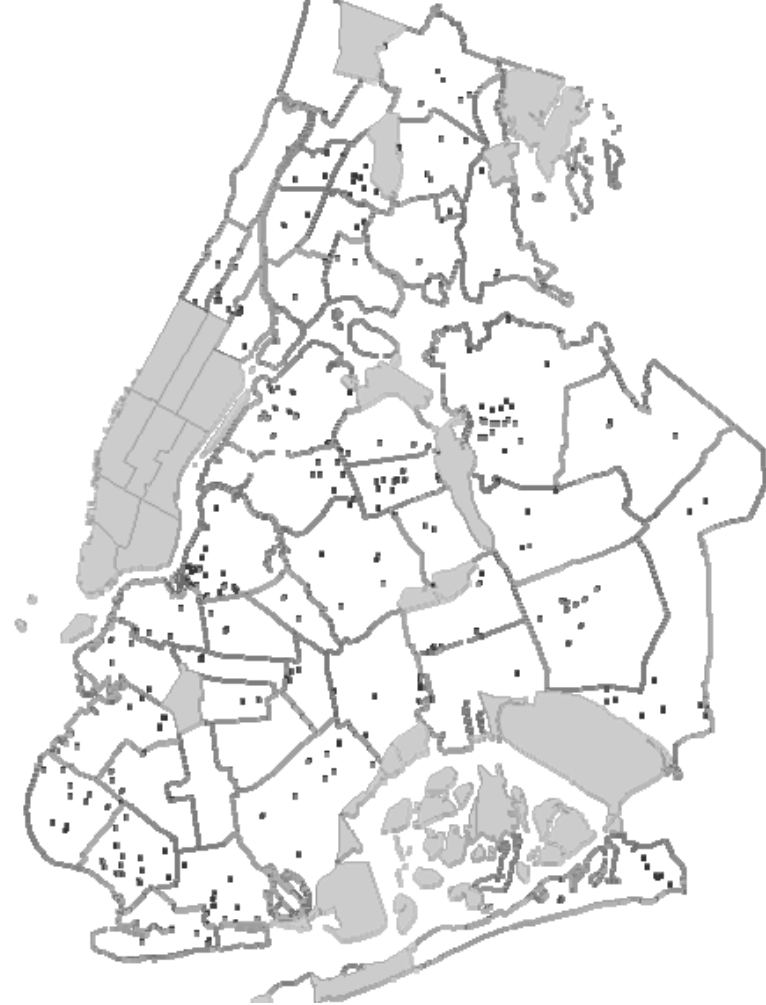
Notwithstanding these data issues, in some locations close to the Manhattan core, the underlying parking requirements may be too high, considering the relatively low levels of car ownership in some densely-developed and transit-rich areas. While the effects of such excessive requirements on new housing would be mitigated by the generous waivers and reductions for small lots, this is also identified as an appropriate focus of follow-up study.

Figure 16: Multi family Buildings

Cars Exceed the Parking Requirement



Parking Requirements Meet or Exceed Demand



Source: NYS Department of Motor Vehicles, Standard Series Vehicle Registrations in Force, 2005 compiled by Department of City Planning; NYC Department of Buildings, New Residential Building Permits, compiled by Department of City Planning

Finding Three: Demographic variables influence car ownership. Families – families with children in particular – tend to select lower density housing and have higher levels of car ownership when compared to non-family households. Higher income households are also more likely to own cars.

Table 7, below, provides an analysis of car ownership by family status, location, and housing type using data from the 2006 American Community Survey. The table indicates that the observed differences by location are a combination of geography, housing type, and demographics. In essence, demographic groups appear to sort themselves based on a propensity to own cars and the likely availability of parking. Family households are always more likely to have cars than non-family households and married couples with children are in most cases more likely to have cars than other family households. Married couples with children are more likely to live in one- to four-family homes and less likely to live in buildings with five or more units. Non-family households live disproportionately in buildings with five or more units and in the areas where car ownership is lowest. However, all family-type groups are less likely to own cars when they live in the low-car-ownership areas closer to the CBD. Note also that the propensity to own two or more vehicles rises dramatically for one- to four-family homes, compared with buildings with five or more units.

The data suggest that a policy of limiting new housing construction in low-density areas and promoting the development of apartment houses in areas close to transit limits car generation, but also places family households, particularly those with children, at a disadvantage since it constrains the development of their preferred housing types. Data show that more households living in one- and two-unit buildings in the middle- and outer-rings are comprised of married couples with children. Nonfamily households are more common in the inner ring, and in five or more- unit buildings in the middle and outer rings.

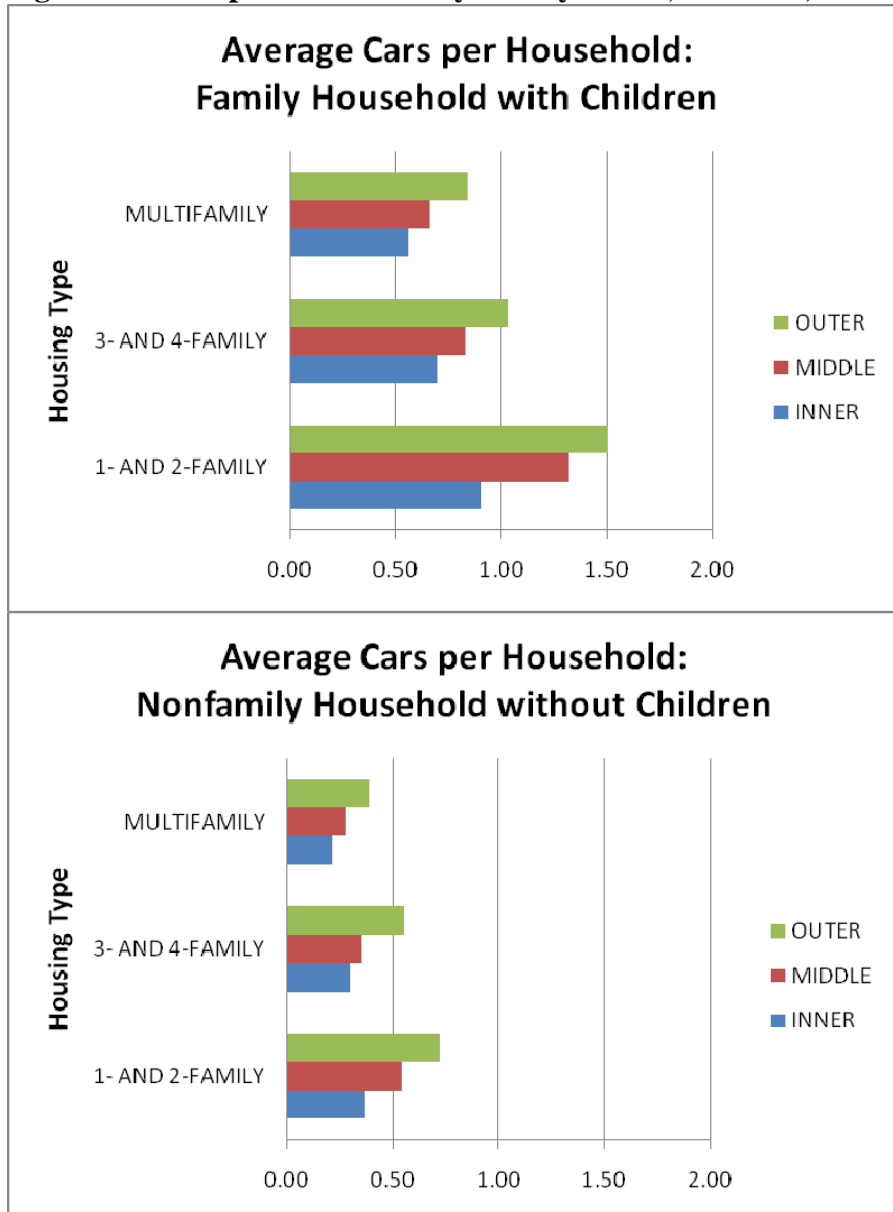
Table 7: Car Ownership for All Housing by Family Status, Location, and Building Type

		All	Families								Nonfamilies	
			Married Couple				Householder, no spouse present					
			With Children		Without Children		With Children		Without Children			
			Number	%	Number	%	Number	%	Number	%		
Inner Ring	1-2 Units	54,434	14,096	25.90%	11,298	20.76%	5,583	10.26%	6,183	11.36%	17,274	31.73%
	No vehicle	23,320	3,847	16.50%	2,807	12.04%	3,108	13.33%	2,369	4.35%	11,189	47.98%
	One vehicle	24,500	8,017	32.72%	6,356	25.94%	1,847	7.54%	2,353	9.60%	5,927	24.19%
	2 vehicles	5,403	1,932	35.76%	1,522	28.17%	628	11.62%	1,234	5.04%	87	1.61%
	3 or more vehicles	1,211	300	24.77%	613	50.62%			227	18.74%	71	5.86%
	3-4 Units	48,573	10,440	21.49%	8,248	16.98%	5,234	10.78%	2,835	5.84%	21,816	44.91%
	No vehicle	28,700	4,181	14.57%	3,516	12.25%	2,940	10.24%	1,820	3.75%	16,243	56.60%
	One vehicle	16,388	5,374	32.79%	3,709	22.63%	1,681	10.26%	749	4.57%	4,875	29.75%
	2 vehicles	2,642	790	29.90%	735	27.82%	472	17.87%	140	0.85%	505	19.11%
	3 or more vehicles	843	95	11.27%	288	34.16%	141	16.73%	126	14.95%	193	22.89%
	5 or More Units	391,377	44,630	11.40%	42,317	10.81%	82,816	21.16%	44,213	11.30%	177,401	45.33%
	No vehicle	294,105	22,888	7.78%	26,270	8.93%	66,650	22.66%	35,472	9.06%	142,825	48.56%
One vehicle	86,626	18,762	21.66%	13,372	15.44%	14,651	16.91%	7,904	9.12%	31,937	36.87%	
2 vehicles	9,745	2,679	27.49%	2,554	26.21%	1,415	14.52%	837	0.97%	2,260	23.19%	
3 or more vehicles	901	301	33.41%	121	13.43%	100	11.10%			379	42.06%	
Middle Ring	1-2 Units	303,890	78,021	25.67%	72,585	23.89%	45,603	15.01%	38,075	12.53%	69,606	22.90%
	No vehicle	94,864	12,434	13.11%	14,859	15.66%	19,028	20.06%	11,848	3.90%	36,695	38.68%
	One vehicle	127,246	33,687	26.47%	30,921	24.30%	18,072	14.20%	15,820	12.43%	28,746	22.59%
	2 vehicles	64,555	26,888	41.65%	19,975	30.94%	6,300	9.76%	7,935	6.24%	3,457	5.36%
	3 or more vehicles	17,225	5,012	29.10%	6,830	39.65%	2,203	12.79%	2,472	14.35%	708	4.11%
	3-4 Units	144,289	30,060	20.83%	21,690	15.03%	28,859	20.00%	17,791	12.33%	45,889	31.80%
	No vehicle	79,185	11,222	14.17%	8,171	10.32%	19,948	25.19%	8,584	5.95%	31,260	39.48%
	One vehicle	49,741	13,286	26.71%	8,933	17.96%	7,616	15.31%	6,683	13.44%	13,223	26.58%
	2 vehicles	13,113	4,984	38.01%	3,400	25.93%	1,295	9.88%	2,254	4.53%	1,180	9.00%
	3 or more vehicles	2,250	568	25.24%	1,186	52.71%			270	12.00%	226	10.04%
	5 or More Units	546,475	67,486	12.35%	68,124	12.47%	126,446	23.14%	60,993	11.16%	223,426	40.88%
	No vehicle	372,138	29,480	7.92%	34,756	9.34%	96,851	26.03%	43,271	7.92%	167,780	45.09%
One vehicle	150,589	32,223	21.40%	27,490	18.25%	25,794	17.13%	14,091	9.36%	50,991	33.86%	
2 vehicles	21,149	5,143	24.32%	5,499	26.00%	3,590	16.97%	2,738	1.82%	4,179	19.76%	
3 or more vehicles	2,599	640	24.62%	379	14.58%	211	8.12%	893	34.36%	476	18.31%	
Outer Ring	1-2 Units	408,416	113,254	27.73%	114,246	27.97%	47,244	11.57%	51,117	12.52%	82,555	20.21%
	No vehicle	81,852	10,944	13.37%	12,322	15.05%	13,949	17.04%	13,153	3.22%	31,484	38.46%
	One vehicle	179,015	45,746	25.55%	47,490	26.53%	20,549	11.48%	21,305	11.90%	43,925	24.54%
	2 vehicles	112,489	45,463	40.42%	39,501	35.12%	9,364	8.32%	12,146	6.78%	6,015	5.35%
	3 or more vehicles	35,060	11,101	31.66%	14,933	42.59%	3,382	9.65%	4,513	12.87%	1,131	3.23%
	3-4 Units	70,474	18,827	26.71%	13,817	19.61%	10,708	15.19%	8,263	11.72%	18,859	26.76%
	No vehicle	31,427	5,182	16.49%	4,894	15.57%	6,994	22.25%	4,389	6.23%	9,968	31.72%
	One vehicle	26,638	8,686	32.61%	5,554	20.85%	2,843	10.67%	2,245	8.43%	7,310	27.44%
	2 vehicles	10,279	4,082	39.71%	2,779	27.04%	675	6.57%	1,162	4.36%	1,581	15.38%
	3 or more vehicles	2,130	877	41.17%	590	27.70%	196	9.20%	467	21.92%		
	5 or More Units	360,896	48,110	13.33%	59,783	16.57%	49,576	13.74%	43,043	11.93%	160,384	44.44%
	No vehicle	204,181	16,895	8.27%	23,030	11.28%	32,838	16.08%	26,826	7.43%	104,592	51.23%
One vehicle	129,976	23,049	17.73%	27,611	21.24%	16,014	12.32%	12,426	9.56%	50,876	39.14%	
2 vehicles	23,997	7,065	29.44%	8,675	36.15%	585	2.44%	3,608	2.78%	4,064	16.94%	
3 or more vehicles	2,742	1,101	40.15%	467	17.03%	139	5.07%	183	6.67%	852	31.07%	

Source: Households by Number of Units in Building and Number of Vehicles, Household/Family Type by Presence of Children from 2006 ACS PUMS, compiled by NYC Department of City Planning

Figure 17 and Table 8 below highlight some of the key data findings revealed in Table 7. The ratio of cars per household is higher among family households with children than nonfamily households in all types of housing and at all distances from Manhattan. Within these family and nonfamily groupings, average cars per household increases as distance from the Manhattan core increases, and decreases as housing density increases. Family households with children living in one- and two- family housing in the outer ring have the highest rates of car ownership – over twice the rate of their nonfamily counterparts.

Figure 17: Cars per Household by Family Status, Location, and Building Type



Source: Households by Number of Units in Building and Number of Vehicles, Household/Family Type by Presence of Children from 2006 ACS PUMS, compiled by NYC Department of City Planning

Table 8 below shows the dispersal of family households with children and nonfamily households within the three rings and by building type. Approximately 45 percent of families with children in the study areas lived in one- and two- family homes in the middle and outer rings. By contrast, 49 percent of nonfamily households lived in multifamily housing in the inner and middle rings. What this reveals is that families select housing of a type and in locations where car ownership is highest, while nonfamily households tend to select apartment buildings closer to the core where car ownership is lower.

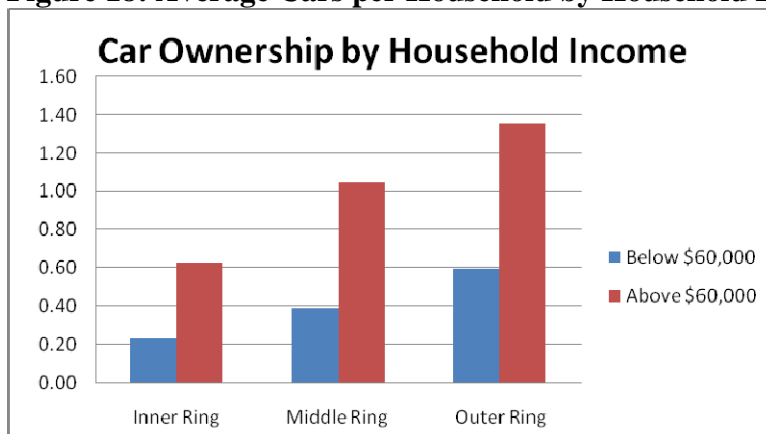
Table 8: Determinants of Car Ownership: Family Status

FAMILY HOUSEHOLD WITH CHILDREN, PERCENT OF TOTAL			
	1- & 2-FAMILY	3- & 4-FAMILY	MULTIFAMILY
INNER	3.32%	2.46%	10.50%
MIDDLE	18.36%	7.07%	15.88%
OUTER	26.65%	4.43%	11.32%

NONFAMILY HOUSEHOLD WITHOUT CHILDREN, PERCENT OF TOTAL			
	1- AND 2-FAMILY	3- AND 4-FAMILY	MULTIFAMILY
INNER	2.11%	2.67%	21.71%
MIDDLE	8.52%	5.62%	27.34%
OUTER	10.10%	2.31%	19.63%

Figure 18, below, breaks down car ownership within the three rings by median income, and shows that, regardless of distance from Manhattan, households with incomes greater than \$60,000 are more likely to own cars than households in their same ring with lower incomes (the \$60,000 threshold approximates the U.S. Department of Housing and Urban Development “low income” definition, which establishes eligibility for many publicly-assisted housing programs). Car ownership also increases steadily as households move further from the Manhattan core, regardless of income. The data indicate that in all areas, but particularly as one approaches the edges of the city, car ownership is widely preferred by households that achieve a measure of discretionary income.

Figure 18: Average Cars per Household by Household Income



Source: ACS 2006

Finding Four: Proximity to transit has a limited influence on car ownership

The discussion of transit-oriented development includes analysis of car ownership patterns among residents with easy access to transit. As Table 9 illustrates, the average ratio of cars per household decreases modestly across the boroughs as households move closer to subway stations. Among single- and two-unit buildings, however, the influence is minimal, and among three- and four-unit buildings proximity to transit has only a slightly greater influence. Among multi-unit (five or more units) buildings the difference in cars per household is most pronounced in the Bronx and Queens (Table 10). Units in Manhattan were not considered due to the low quantity of new units built far from a subway station.

Comparing the average for the city as a whole, close proximity to a subway station decreases car ownership by an average of only about 0.25 cars per household. Therefore, for every four households living within a ¼-mile of a subway station there is only one fewer car among them than among four households further from a station.

Note also that denser housing types are frequently located closer to transit, and that the effect of housing type on car ownership is greater than the effect of proximity to transit. Table 10 illustrates that the effect of proximity to transit on car ownership is attributable largely to differences in housing type.

Table 9: Average Cars per Unit by Distance from the Nearest Subway Station, New Housing 1995-2005

Borough	More than .25mi from Station	Within .25mi of Station
BROOKLYN	0.74	0.72
BRONX	0.87	0.71
QUEENS	0.97	0.63
Grand Total	0.88	0.70

Source: NYC Department of City Planning, NYS DMV

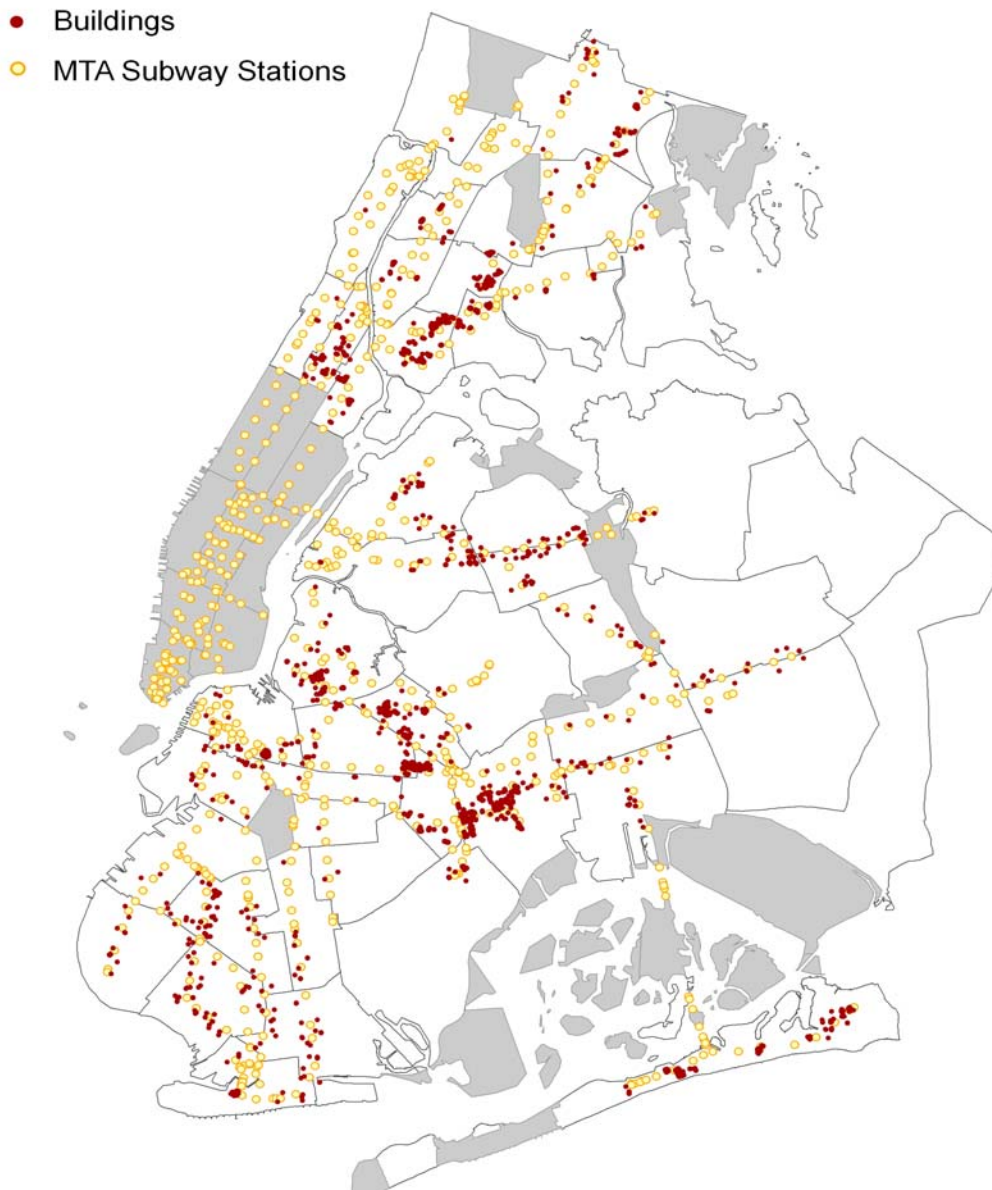
Table 10: Car Ownership and Proximity to Transit by Building Type

	Housing Type	Far from Subway (more than ¼ mile)	Near Subway (within ¼ mile)
Brooklyn	All Housing	0.74	0.72
	1- and 2-unit	1.47	1.27
	3- and 4- unit	0.95	0.82
	5+ unit	0.44	0.40
Bronx	All Housing	0.87	0.71
	1- and 2-unit	1.19	1.12
	3- and 4- unit	0.77	0.71
	5+ unit	0.63	0.36
Queens	All Housing	0.97	0.63
	1- and 2-unit	1.43	1.21
	3- and 4- unit	0.82	0.74
	5+ unit	0.56	0.39

Source: NYC Department of City Planning PLUTO Data, NYS DMV

As Figure 19 illustrates, there exists a substantial number of new buildings in the sample studied located in proximity to transit where the number of cars registered exceed required parking. Over 30 percent of all new housing in the sample is within ¼-mile of a subway station and has a higher number of cars registered to residents than the number of parking spaces required.

Figure 19: Registered Cars, Required Parking and Proximity to Transit – New Buildings within ¼-mile of Subway Station where Registered Cars Exceed Required Parking



Source: NYS Department of Motor Vehicles, Standard Series Vehicle Registrations in Force, 2005; NYC Department of Buildings, New Residential Building Permits, compiled by Department of City Planning

While it is not the city’s objective to encourage car ownership where viable public transportation options exist, these patterns bring into question the argument that is made by a number of commentators that residential units built close to a subway station have no real need to provide parking.⁵

Automobile usage does not depend solely on the owner’s journey to work, nor is the city’s transit system sufficient for transporting all residents from home to work and back. As discussed above, in many cases, housing units may be close to one subway line, but residents may still perceive the need to own a car. New York City’s subway system is designed, for the most part, to bring riders to and from the core of Manhattan, which has, by far, the largest concentration of employment and other activity in the region, as well as the smaller employment concentrations in downtown Brooklyn and Long Island City. However, New York City residents are still more likely to work in the borough in which they live than anywhere else, as shown in Table 11. Given that intra-borough transit options may be more limited, it is likely that many of these workers are relying on cars for their daily commute. Indeed, an analysis of census data on mode of transportation to work – shown below in Table 12 – reveals that for people working in the Bronx, Brooklyn, northern Manhattan, and Queens, almost half of all commuters listed the car as their primary mode of transportation. These data suggest that households in locations further from employment in Manhattan’s CBD rely more heavily on cars to access employment and likely exhibit correspondingly high rates of auto ownership.

Table 11:
Percentage of Total Residents in Each Borough by Borough of Work

<i>Borough of Residence</i>	<i>Borough of Work</i>					
	Bronx	Brooklyn	Queens	Staten Island	Manhattan	Outside NYC
Bronx	41.0	4.1	4.2	0.5	38.5	11.6
Brooklyn	1.2	48.0	6.8	1.0	38.2	4.7
Queens	1.9	9.3	40.0	0.5	37.5	11.0
Staten Island	0.6	15.0	2.9	45.5	28.0	7.8
Manhattan	2.7	3.4	2.6	0.4	84.3	6.6

Source: U.S. Census Bureau, 2000 Census Special Tabulation Table CTPP P-7

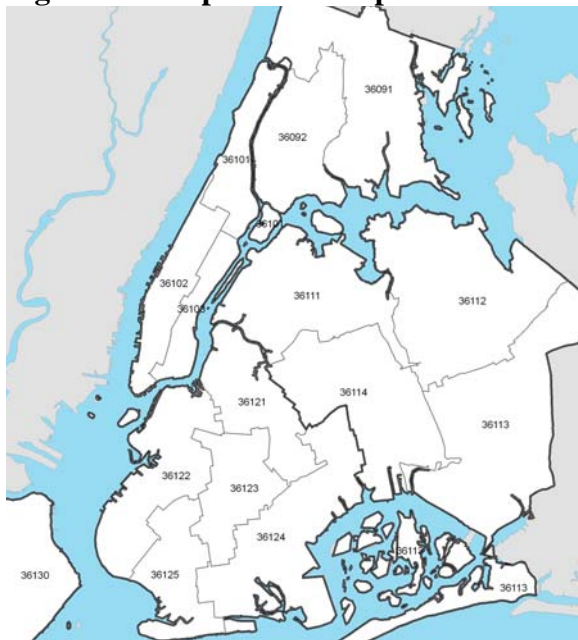
5 See Alex Garvin and Nick Peterson, “The High Price of Parking,” *The New York Times*, op-ed, December 23, 2007

Table 12: Total Workers by Place of Work and Mode of Transportation to Work

<i>Super-PUMA of Work</i>	<i>Mode of Transportation to Work</i>						Total
	Car	% Car	Bus	Subway	Walk	Others	
<i>Bronx</i>							
36091- North & East	74,089	57.70	19,356	13,690	13,199	8,062	128,396
36092- South & West	75,307	49.02	25,035	27,608	15,720	9,961	153,631
Total	149,396	52.97	44,391	41,298	28,919	18,023	282,027
<i>Brooklyn</i>							
36121- Greenpoint/Brownsville	53,200	46.99	14,197	22,289	15,794	7,738	113,218
36122- Ft. Greene/Bay Ridge	108,318	39.53	28,106	88,796	24,482	24,283	273,985
36123- Crown Heights/Flatbush	44,856	45.54	16,750	17,436	11,484	7,973	98,499
36124- Gravesend/East New York	52,206	56.32	13,137	11,332	10,115	5,913	92,703
36125- Borough Park/Coney Island	44,758	50.78	10,578	12,299	14,687	5,819	88,141
Total	303,338	45.51	82,768	152,152	76,562	51,726	666,546
<i>Manhattan</i>							
36101 - North	46,473	33.65	16,501	37,569	22,632	8,571	138,100
<i>Queens</i>							
36111- Northwest	116,992	54.02	17,200	47,895	19,962	14,524	216,573
36112- Northeast	82,526	61.94	15,328	14,265	11,862	9,265	133,246
36113- Southeast	96,819	66.77	18,393	12,572	7,013	10,215	145,012
36114- Southwest	58,666	58.07	10,643	13,299	11,560	6,856	101,024
Total	355,003	59.58	61,564	88,031	50,397	40,860	595,855

Source: U.S Census Bureau, 2000 CTPP PART 2: Total Workers at Place of Work (Regardless of Residence), compiled by NYC Dept. of City Planning

Figure 20: Map of NYC Super-Public Use Microdata Areas (PUMA)



Source: NYC Department of City Planning

Additionally, a more affluent population and more job opportunities outside of New York City have resulted in an increasing number of City residents who work in the suburban counties. Between 2000 and 2006, the percentage of New York City residents reverse-commuting (living in NYC and working outside of the city) increased by 14.2 percent, to 278,732, according to data from the American Community Survey, with the greatest increases occurring for residents working in the northern east-of-Hudson suburbs and on Long Island (Table 13). While transit use by reverse commuters has risen substantially, such commute patterns may favor the automobile for higher-income workers who can afford one, as transit options are fewer outside of the City and schedules are more limited when traveling against the majority of commuters. As shown in Table 13, 197,483, or 71 percent of the 2006 out-commuters from New York City drove or carpooled. This number increased by 12 percent from 2000 to 2006.

The numbers of New York City residents working in the Bronx, Brooklyn, and Queens also increased during this same period, by 26.9 and 10.1 percent, respectively, while the number working in Manhattan increased by 2 percent. While transit use within the city in general is at the highest levels in many decades, the sheer size and widely dispersed origins and destinations of these employment flows result in substantial numbers of workers who find auto commuting more convenient and even essential. As shown in Table 14, while auto commuting into Manhattan by New York City residents fell between 2000 and 2006, it increased in the Bronx. In Brooklyn and Queens, auto commuting fell slightly, but the change was not statistically significant.

It is also important to note that as one moves farther from the core of Manhattan, households have other reasons to drive, and have fewer options to travel via public transportation even if transit is nearby. Shopping, school, and recreation destinations tend to be further from the home and, while still more urban in nature than suburban movement, travel is more dispersed than in the more dense neighborhoods of the city. The lifestyle patterns of boroughs outside of Manhattan appeal to many city residents, and are seen as desirable alternatives to moving outside of New York City. The amenities afforded in these areas keep family households in the City.

Table 13: New York City Residents at Work in the NY-NJ-CT Metropolitan Region, 1990-2006

	1990		2000		2006		Change, 2000-2006	
	Number	%	Number	%	Number	%	Number	%
Total Workers Residing in New York City and Working in Metropolitan Region:	3,123,058	100	3,148,522	100	3,362,465	100	213,943	6.8
Workplace in New York City	2,892,736	92.6	2,904,497	92.2	3,083,733	91.7	179,236	6.2
Bronx	229,925	7.4	217,766	6.9	274,442	8.2	56,676	26
Brooklyn	597,669	19.1	589,387	18.7	642,398	19.1	53,011	9
Manhattan	1,523,500	48.8	1,523,549	48.4	1,553,698	46.2	30,149	2
Queens	453,760	14.5	468,590	14.9	515,982	15.3	47,392	10.1
Other Workplace in Metropolitan Region	230,322	7.4	244,025	7.8	278,732	8.3	34,707	14.2
Metro North Railroad Area	55,684	1.8	54,639	1.7	70,858	2.1	16,219	29.7
Long Island Railroad Area	92,995	3	106,434	3.4	117,376	3.5	10,942	10.3
New Jersey Transit Area	81,643	2.6	82,952	2.6	90,498	2.7	7,546	9.1
<i>Metro North Railroad Area: New York State Counties - Dutchess, Putnam and Westchester; Connecticut Counties - Fairfield, Litchfield and New Haven</i>								
<i>Long Island Railroad Area: New York State Counties - Nassau and Suffolk</i>								
<i>New Jersey Transit Area: New Jersey Counties - Bergen, Essex, Hudson, Hunterdon, Mercer, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Warren and Union; New York State Counties - Orange, Rockland, Sullivan and Ulster</i>								
Source: U.S. Census Bureau, 2006 American Community Survey 1% PUMS File, 2000 and 1990 5% PUMS Files; Population Division - New York City Department of City Planning								

Table 14: New York City Residents at Work in the NY-NJ-CT Metropolitan Region who Drive or Carpool to Work, 2000-2006

	2000				2006				Change, 2000-2006			
	Total		Drive or carpool		Total		Drive or carpool		Total		Drive or carpool	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Total Workers Residing in New York City and Working in Metropolitan Region:	3,148,522	100	1,035,276	100	3,362,465	100	982,291	100	213,943	6.8	-52,985	-5.1
Workplace in New York City	2,904,497	92.2	859,024	83	3,083,733	91.7	784,808	79.9	179,236	6.2	-74,216	-8.6
Bronx	217,766	6.9	90,448	8.7	274,442	8.2	102,313	10.4	56,676	26	11,865	13.1
Brooklyn	589,387	18.7	249,140	24.1	642,398	19.1	239,592	24.4	53,011	9	-9,548	-3.8
Manhattan	1,523,549	48.4	196,355	19	1,553,698	46.2	136,449	13.9	30,149	2	-59,906	-30.5
Queens	468,590	14.9	247,725	23.9	515,982	15.3	237,167	24.1	47,392	10.1	-10,558	-4.3
Staten Island	105,205	3.3	75,356	7.3	97,213	2.9	69,287	7.1	-7,992	-7.6	-6,069	-8.1
Other Workplace in Metropolitan Region	244,025	7.8	176,252	17	278,732	8.3	197,483	20.1	34,707	14.2	21,231	12
Metro North Railroad Area	54,639	1.7	38,832	3.8	70,858	2.1	46,598	4.7	16,219	29.7	7,766	20
Long Island Railroad Area	106,434	3.4	80,754	7.8	117,376	3.5	92,163	9.4	10,942	10.3	11,409	14.1
New Jersey Transit Area	82,952	2.6	56,666	5.5	90,498	2.7	58,722	6	7,546	9.1	2,056	3.6

Source: U.S. Census Bureau, 2006 American Community Survey 1% PUMS File, 2000 and 1990 5% PUMS Files; Population Division - New York City Department of City Planning

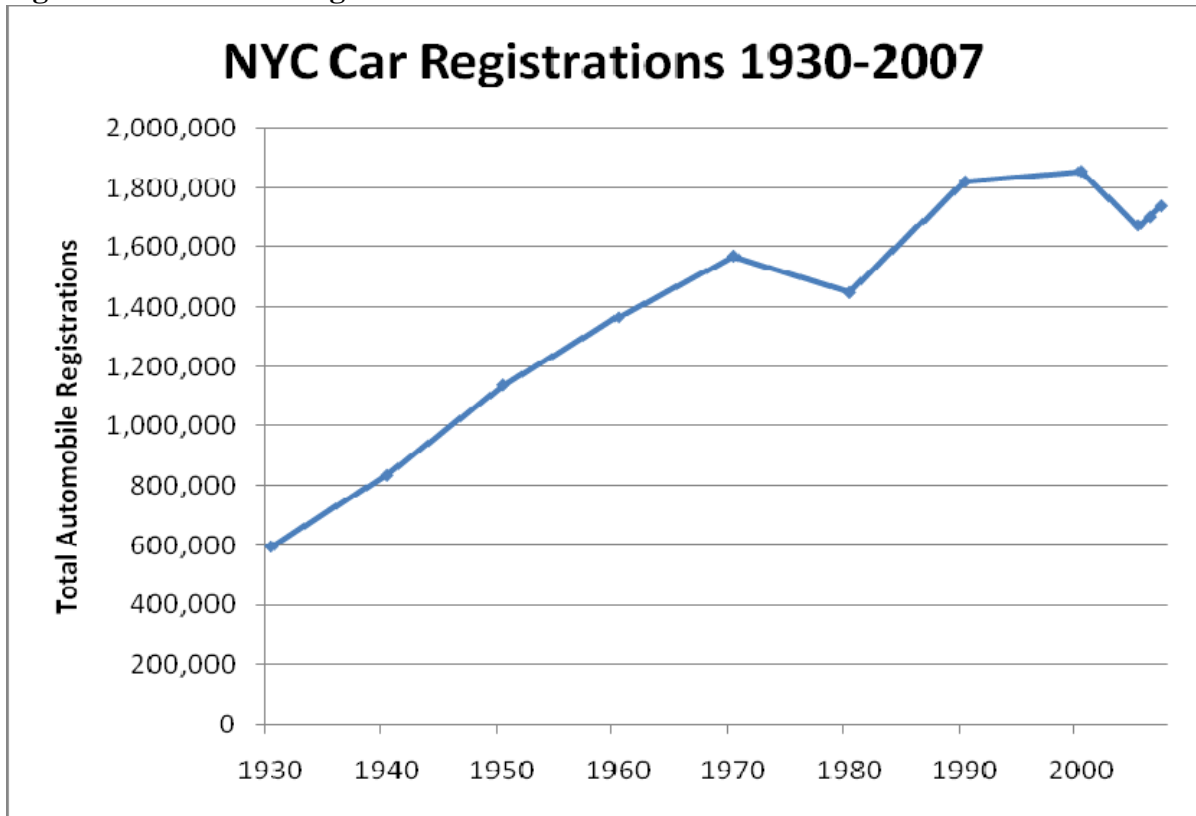
Finding Five: Parking requirements do not determine car ownership patterns

While tremendous housing and population growth has spurred a chorus of complaints about an under-supply of parking and a call to increase parking requirements, a contradictory voice has also gained traction. Transportation planners and environmental advocates in particular have argued for a reduction in required parking in an effort to reduce the demand to own a car. It has been argued that by providing parking essentially for free by requiring developers to provide accessory off-street parking, households will choose to own – and drive – a car they might not otherwise have, thus exacerbating both traffic and sprawl by generating more cars.⁶ This suggests the problem of inadequate parking will never go away as long as zoning requires parking, because the supply itself drives increasing rates of car ownership.

Data are not available on the supply of accessory off-street residential parking in New York City. However, a review of the citywide auto ownership rates and changes in New York City parking requirements dating back to the 1920s suggest, at best, a weak relationship between car ownership and parking requirements. As shown in Figure 21 below, events wholly independent of parking requirements – World War II, post-war suburbanization, the combined effects of population decline, and the adverse economic conditions at the time of the city’s fiscal crisis of the 1970s, and the September 11th World Trade Center terrorist attack – seem to affect rates of auto ownership in more profound ways. In contrast, significant increases or declines do not occur following major changes to parking requirements in New York City, such as permitting off-street parking in residential buildings in 1938, first requiring parking in 1950, substantially increasing required parking in 1961, and reducing the requirements as part of the changes to the rules for the Manhattan Core, quality housing, and residential infill. Indeed, car ownership rates in New York City, while low compared to nationwide averages, have steadily increased since the end of World War II, abating only briefly in response to periodic recessions, population decline, and spikes in energy prices.

⁶ Shoup, Donald. “The High Cost of Free Parking,” APA Planners Press, 2005.

Figure 21: NYC Car Registrations 1930-2007

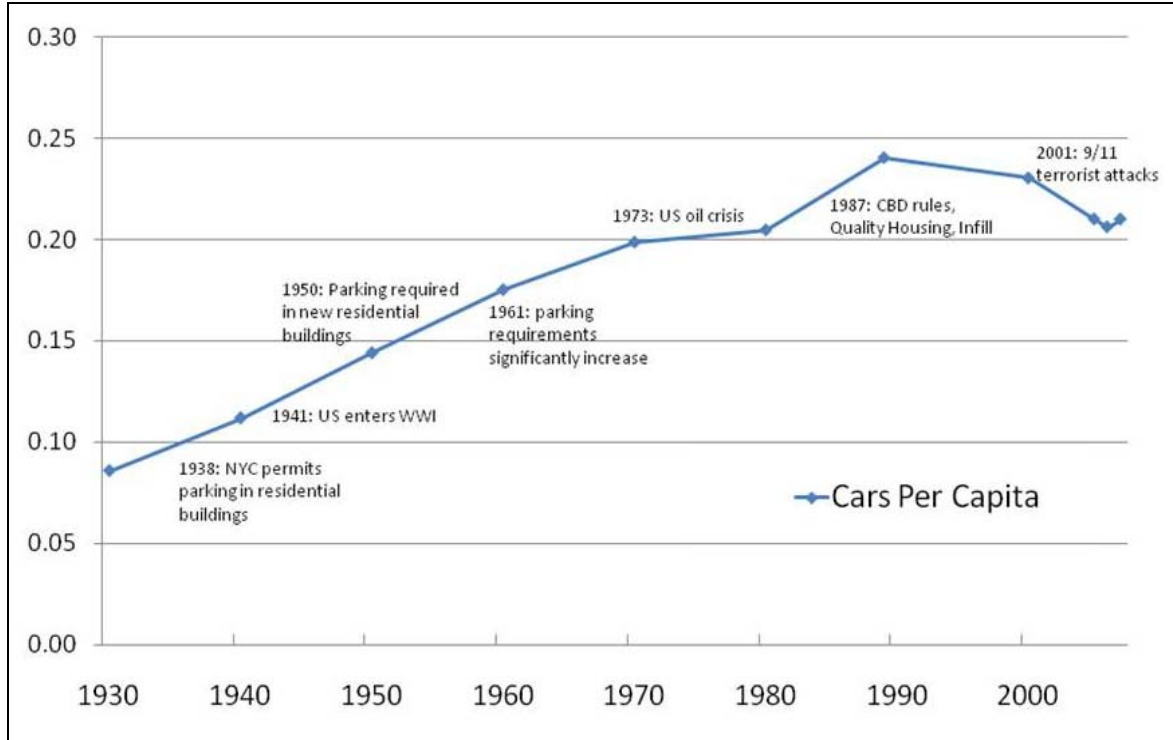


Source: New York State Dept. of Motor Vehicles, Passenger Vehicle Registrations, New York City, 1930-2007

A similar analysis showing per capita motor vehicle registrations by 10-year intervals (when decennial census population data were available)⁷ accounts for changes in population to show a per capita rate of auto ownership. As shown in Figure 22 below, rates of vehicle ownership rose steadily between 1920 and 1990, despite leveling off briefly during the oil and city fiscal crises of the 1970s. After 1990, the per-capita rate of vehicle registrations stabilized, independent of any change to the parking requirements.

⁷ Census enumerated populations in the years 1990 and 2000 were adjusted for undercount to provide a more accurate picture. See http://nyc.gov/html/dcp/pdf/census/projections_briefing_booklet.pdf, p. 25, for an explanation of the adjustment methodology.

Figure 22: Per Capita Passenger Vehicle Registrations, New York City 1930-2007

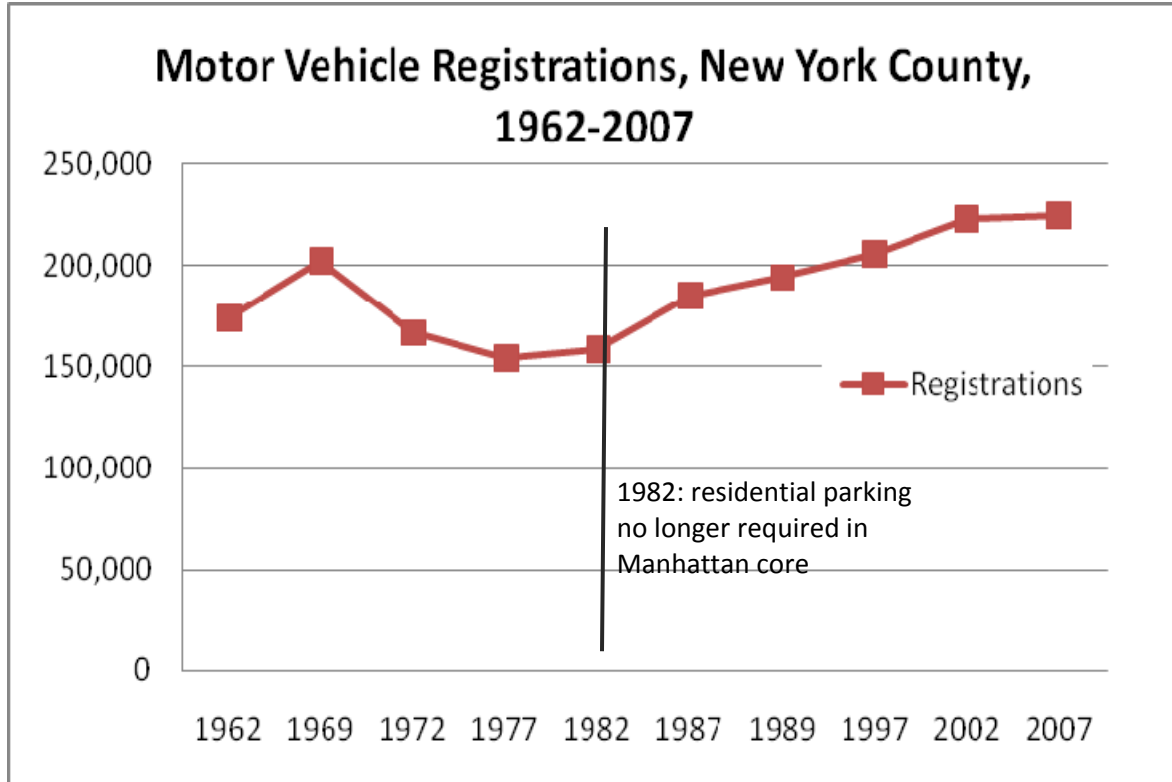


Source: New York State Dept. of Motor Vehicles, Passenger Vehicle Registrations, New York City, 1930-2007; US Census 1930-1980; DCP Census Adjustment figures 1990-2000; DCP Population Projections 2005-2007

A slight decline in total registrations and registrations per capita is also observed after 2000. DMV registrations show fewer cars being registered to addresses in the city; however, census data reveals an increasing number of residents reporting having access to a car. As discussed above, one theory for this discrepancy lies with auto insurance rates for cars registered within the city versus those registered to other addresses.

While not the focus of this study, the Manhattan core represents an interesting case study in the limited effect of zoning requirements on the public's propensity to own cars. Residential vehicle registrations in Manhattan declined during the fiscally troubled early seventies when the Zoning Resolution required parking. Since 1982, parking has not been required for new residential buildings in the Manhattan Core, and the amount of permitted parking is limited. Notwithstanding these restrictions, residential vehicle registrations in New York county have continued to rise (Figure 23). The increase is a reflection of rising affluence and the propensity of households with high incomes to own cars. These households are able to tolerate the high cost of Manhattan off-street parking induced by the zoning restrictions on supply.

Figure 23: Motor Vehicle Registrations in Manhattan, 1962-2007



Source: New York State Dept. of Motor Vehicles, Passenger Vehicle Registrations, New York County, 1962-2007

The results of this study show that despite having identical zoning requirements, rates of car ownership varied widely depending on the type and location of housing. This suggests that it is not the requirements themselves that influence car ownership, but rather, housing density and distance from the core of Manhattan, among other factors, such as the habit of families with children to select housing in lower density areas where parking is available.

VI. Conclusions and Policy Considerations

The purpose of this study is to document and explore current car ownership patterns outside the Manhattan core and Staten Island in light of existing residential parking requirements. It is an important initial step in a greater effort by the city to address parking problems identified by communities as well as formulate effective policy for the future. This study demonstrates that auto ownership per new housing unit is affected most significantly by location and building type – two factors which are accounted for indirectly by the existing mechanism for determining parking requirements within the city’s Zoning Resolution. This study has also identified that income and family structure are important determinants of car ownership and that geographic differences in car ownership reflect the uneven distribution throughout the city of those households that are more likely to own cars.

The district-based framework for regulating required parking is an imperfect surrogate for all the factors that go into car ownership. It is successful in reflecting the general pattern of increasing density and decreasing car ownership as one approaches the Manhattan core. However, the city’s land use pattern and the lifestyles characteristic of different neighborhoods are too complex to be represented even by the sizable range of zoning districts that exist. The Department’s policy has been to address mismatches between the zoning requirements and neighborhood needs on a case-by-case basis, through exceptions to the underlying rules and special zoning districts. The data indicate that these tailor-made solutions will need to be updated and elaborated to meet community needs.

A broader question relates to whether the data point to the need for a broad reformulation of the underlying parking requirements in the Zoning Resolution. The Department is not prepared at this time to reach such a conclusion. Any effort to reformulate parking requirements should consider the previously mentioned factors, address the problem of unnecessary subdivisions and parking waivers, as well as carefully consider all of the following related policy issues: improving neighborhood quality of life, encouraging economic development, reducing housing cost and increasing housing supply, and promoting city policies to reduce auto trips and encourage residents to use mass transit. These policy goals are diverse and sometimes in tension. A decision to change the current parking requirements would need to consider the potential effect on these different policy objectives.

Any effort to increase parking requirements could potentially increase housing costs as developers pass on the cost of constructing additional parking spaces to buyers and renters. Additionally, the relationship between changing parking and housing supply should also be examined to understand whether developers are likely to build fewer, larger units in an effort to avoid providing greater amounts of parking. This may also raise the cost of housing.

Any higher parking requirement may also present a design challenge in many cases – depending on the building type and lot size which would also add cost to a project. Designs for typical buildings might need to be modified to accommodate additional parking and new designs could affect neighborhood character in parts of the city.

A further question, raised by Donald Shoup, author of “The High Cost of Free Parking” and Director of the Institute of Transportation Studies and Chair of the Department of Urban Planning at UCLA, and other is whether zoning should merely accommodate the public’s propensity to own cars or try to influence it. This concept, sometimes referred to as “parking demand management” may seem appealing in concept but the number of policy levers available to the government is limited. One measure that has received wide attention is car-sharing, in which a private company rents out cars for short periods, allowing households with limited need to use a car to save money, relative to the cost of ownership. Car sharing reduces the total number of cars that need to be parked in the city and may reduce the total number of trips, because renters will be inclined to combine several errands in a single rental to save money. While car sharing companies are operating in New York City, they are also affected by the high cost of off-street parking and the limited availability of on-street parking. Government should explore ways of making this type of business more feasible to operate successfully. Greater reliance on bicycles can substitute for some auto trips and the City is undertaking a range of initiatives to promote bicycle use. Improvements in bus service, such as bus priority and select bus service, can improve travel times and make bus travel a more attractive alternative.

Other types of demand management are harder to foresee. The city has promoted commercial development in its Central Business Districts where the transit share for commutation is extremely high. However, the trends that are dispersing employment to the peripheral areas of the city and to the suburbs are also very strong. These include the growth of industries such as health care, colleges and universities, and retailing which are dispersed throughout the region, as well as labor shortages in the suburbs due to the aging of the population and the lack of affordable housing. Provision of more mass transit to dispersed locations is in many cases difficult and costly. Other auto use patterns, such as those for shopping and recreation, may reflect strong consumer preferences, and any effort to restrict such patterns may meet strong resistance from the public and result in this population leaving New York City for an even more auto-oriented lifestyle.

VII. Recommendations for Further Study

Analyze building plans to examine the effect of off-street parking on urban design, parking lot layout, streetscape, and building typology

To understand the design implications of providing parking, building plans for common building types should be evaluated based on their ability to accommodate additional parking from a design perspective. Questions that should be asked include:

- How much parking is provided in new buildings?*
- Where is the parking located?*
- What are the design consequences from an urban design viewpoint?*

The Department of City Planning is currently in the process of obtaining and examining parking plans and zoning calculations from a sample of building plans with registered vehicles. This will allow for a better understanding of how development designs facilitate current parking

requirements, and what the potential effects of changing requirements or waivers could have on urban design and parking location.

Update DMV auto registration data

Auto registration data from 2005 to the present would be a valuable update to this study. New development in the city has increased during this timeframe with several large rezonings (e.g. Greenpoint/Williamsburg, Downtown Brooklyn) that have resulted in significant new residential development, and future patterns could best be estimated by looking at the most recent data. New data would be uniquely valuable in studying large multi family buildings. Recent years of development have shown a dramatic increase in large developments for a range of incomes, particularly along the Brooklyn and Queens waterfront as well as in Manhattan.

Work with the city's Department of Housing Preservation and Development to gain better information about affordable housing

Currently there are differing parking requirements for affordable housing. The current parking requirement for affordable units is significantly lower than other market rate housing. Due to this fact, the affordable requirements warrant further study separate from market rate housing.

Evaluate impacts on cost of housing

The effect of parking requirements on the cost of housing has always been a major issue. With the Department having raised requirements in some areas while lowering these requirements in Long Island City, in particular, an evaluation of how these changes affected development costs and sales prices or rents would be valuable.

Evaluate impacts of proximity to transit on parking demand

This study determined that proximity to transit does not affect auto ownership drastically or nearly to the extent that proximity to the Manhattan CBD does. However, there could be variations within smaller geographies that indicate a stronger correlation between developments located very near to transit and those further away. Furthermore, proximity to transit could be an increasingly important factor as density increases citywide, particularly along transit corridors. New research could evaluate auto ownership within transit buffers at the neighborhood level to determine whether the effect of proximity to transit could be included, at least in some areas, as a more important factor in the determination of parking requirements.

Explore demand management opportunities, such as car-sharing, bus service improvements, and bike lanes, bike parking, and bike sharing

The Department of City Planning will work with the City's Department of Transportation and the Metropolitan Transportation Authority, where appropriate, to study and implement demand management measures.

Gain better understanding of patterns of vehicle utilization.

The Department will study the times of day, and purposes for which, auto owners use their cars or, alternatively, use transit, with a focus on the areas close to the Manhattan CBD where transit substitutes exist for many potential auto trips.

Appendix A: New York City Zoning Resolution, Off-Street Parking Requirements for New Residential Developments by District

<i>Zoning District</i>	<i>Off-street Parking Requirement (Spaces per Dwelling Unit)</i>	<i>Reduction in Required Parking for Small Lots</i>		<i>Waiver if Required Number of Spaces is Equal to or Less Than:</i>	<i>Waiver if Lot Width is Less Than (In Feet):</i>
		<i>Small Lot Size</i>	<i>Off-street Parking Requirement</i>		
R1-1, R1-2	1.00				
R2, R2A, R2X	1.00				
R3X, R3-2	1.00				
R3A	1.00				25
R4	1.00				
R4 Infill	0.66				
R4-1	1.00				25
R4A	1.00				
R4B	1.00			1	40
R5	0.85				
R5A	1.00				
R5 Infill	0.66				
R5B	0.66			1	40
R5D	0.66			1	
R6	0.70	10,000	0.50	5	
R6 QH	0.50			5	
R6A	0.50			5	
R6B	0.50			5	40
R7-1	0.60	10,000	0.30	5	
R7-1 QH	0.50	10,000	0.30		
R7-2	0.50	15,000	0.30	15	
		10,000	None		
R7A	0.50	10,000	0.30	15	
R7B	0.50			5	40
R7D	0.50	10,000	0.30	15	
R7X	0.50	10,000	0.30	15	
R8, R8A, R8X	0.40	15,000	0.20	15	
		10,000	None		
R8B (except Brooklyn)	0.50			15	40
R8B (Brooklyn)	0.40			15	40
R9, R9A, R9X	0.40	15,000	0.20	15	
		10,000	None		
R10, R10A, R10X	0.40	15,000	0.20	15	
		10,000	None		

Appendix B: Glossary

Infill	Infill zoning permits multifamily housing on blocks entirely within R4 or R5 districts in predominantly built-up areas. Infill housing has higher floor area ratios and lower parking requirements than would otherwise be applicable in the zoning district.
QH, or “Quality Housing”	The Quality Housing Program, mandatory in contextual R6 through R10 residence districts and optional in noncontextual districts, encourages development consistent with the character of many established neighborhoods. Its bulk regulations set height limits and allow high lot coverage buildings that are set at or near the street line. Quality Housing buildings must also have amenities relating to the planting of trees, landscaping and recreation space.

Appendix C: Long Island City Special Parking Regulations



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