PARKING LOTS: AN INVESTIGATION OF PUBLIC SPACE IN THE CONTEMPORARY AMERICAN CITY

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Parking Lots: An investigation of Public Space in the Contemporary American City

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SUMMARY

The surface parking lot was a key element in the destruction of traditional public space. It fragmented the fabric of traditional cities, prompting the sprawl of twentieth century cities and suburbs. The automobile permitted the average individual, for the first time in history, to move through public space insulated in a private shell, shielded from strangers and protected from undesirables. Consequently, the role of the sidewalk dwindled. The automobile and the parking lot dominated the pedestrian and the sidewalk, whose diminished vitality further encouraged widespread automobile use. As a result, the parking lot became one of the defining features of the American city.

In the United States parking lots are expected to be utilitarian, prevalent and free. Even as traditional public spaces disappeared, there was little demand for new public spaces, particularly not in the parking lot.

Through investigations of parking history and public space, this thesis argues that parking lots, by virtue of their visual and physical accessibility, are contemporary public space. Although they are singular in their use, in contrast to the multifaceted street, parking lots are the settings for modern public life. This thesis further asserts that the simple landscape of the utilitarian parking lot can be transformed into complex public space, thereby enlivening the public realm.

1. INTRODUCTION

The surface parking lot was a key element in the destruction of traditional public space. It fragmented the fabric of traditional cities, prompting the sprawl of twentieth century cities and suburbs. The automobile permitted the average individual, for the first time in history, to move through public space insulated in a private shell, shielded from strangers and protected from undesirables. Consequently, the role of the sidewalk dwindled. "Substantially reduced, if not gone all together, was vibrant street life. The term *street life,* popularized by Jane Jacobs and other critics of what automobiles had done to American cities, was, perhaps, a misnomer. It was actually *pedestrian congestion* that was missing, the kind of lively sidewalk activity that supported a real sense of urbanity."[1] The automobile and the parking lot dominated the pedestrian and the sidewalk, whose diminished vitality further encouraged widespread automobile use. As a result, the parking lot became, one of the defining features of the American city.

In the United States parking lots are expected to be utilitarian, prevalent and free. "Parking lots were parking lots. For the most part they existed not so much from building something new as by demolishing something old. Beyond signage, few of the accoutrements of place-product-packaging readily applied. Parking did not involve architecture."[2] Even as traditional public spaces disappeared, there was little demand for new public spaces, particularly not in the parking lot. "Customers, after all, sought cheap parking, convenience and usually little else. The vast majority of Americans were

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[1] Jackle, John and Keith A. Sculle. Lots of Parking: Land Use in a Car Culture. University of Virginia Press, Charlottesville and London. 2004. p. 160.

[2] Jackle 54.

willing to accept meanness in parking lot surrounds."[3] Unfortunately the combination of strictly utilitarian goals and strong physical presence created a landscape dominated by unsightly voids and incapacitated public spaces.

Through investigations of parking history and public space, this thesis argues that parking lots, by virtue of their visual and physical accessibility, are contemporary public space. Although they are singular in their use, in contrast to the multifaceted street, parking lots are the settings for modern public life. This thesis further asserts that the simple landscape of the utilitarian parking lot can be transformed into complex public space, thereby enlivening the public realm.

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[3] Jackle 108

2. PARKING HISTORY

What does parking mean to Americans? That is, what is its importance historically? What are its social implications? Have we as a nation done well in our reconfiguring of built environment around parking needs?...Awareness needs to be raised regarding parking's significance as an American landscape imperative. Parking has proven to be an easily taken-for-granted topic, with the act of parking perhaps too everyday and the places for parking too commonplace to excite much respect. By its insidious nature as a kind of necessary evil, parking commands not only little respect but also little affection.[4]

BEFORE WORLD WAR II

The first commercial parking lot in the United States opened in 1917[5]. Early parking lots were often established in vacant lots as temporary land uses to finance property taxes before new construction. However, operators soon found that the new temporary parking lots were profitable. In some cases, leasing a parking stall on an hourly or daily basis proved to be more advantageous than leasing square footage in a building on a monthly or yearly basis. Parking lots required little or no site renovation,

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[4] Jackle 233

[5] Some scholars attribute the first commercial parking lot to Max Goldberg in Detroit, Michigan in 1917, however others believe the first commercial lot was developed by Herman R. Schmitt in Dusquense Pennsylvania in 1914. (Jackle 48)

maintenance or operating fees. The early lots were so lucrative and easy to manage that owners began tearing down unsuccessful buildings to pave more surfaces for parking. The parking lot was beginning to assume a key role in the definition of the American landscape.

After World War I, the parking lot became an essential element of the city. "Traffic engineering" emerged as a profession[6], and with it came off-street parking's first appearance in zoning: "The first reported ordinance was in Columbus, Ohio, where in August 1923, requirements were composed which prescribed that off-street parking spaces be provided in connection with multiple-family dwellings."[7]

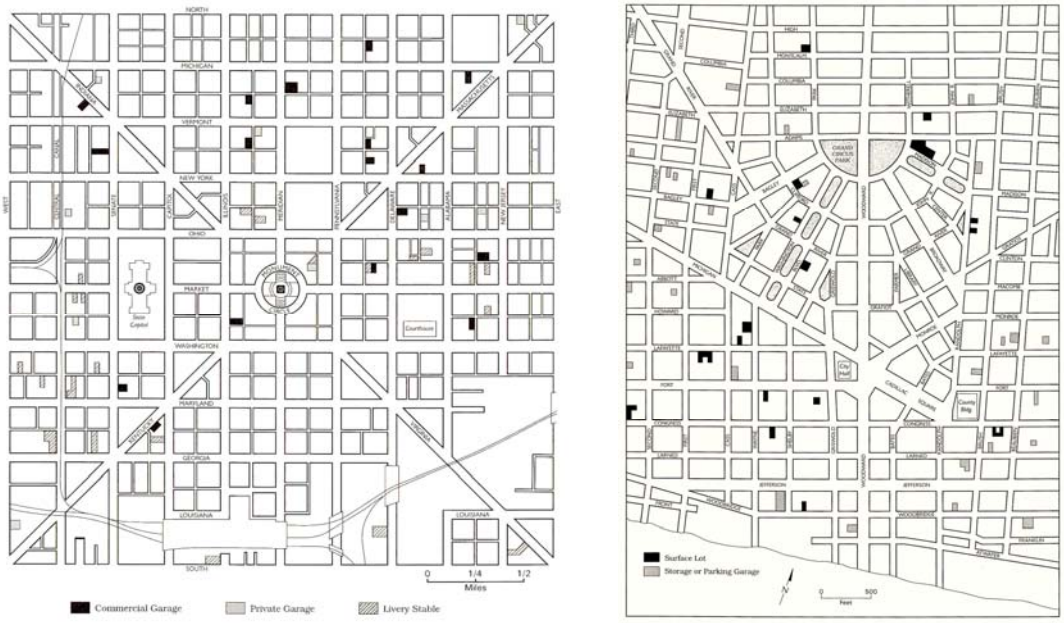

Figure 2.1
Left: Automobile storage cars and livery stables in downtown Indianapolis, 1914. *Source*: Sanborn Map Company, *Sanborn Insurance Maps of Indianapolis, Indiana* (New York, 1914) as cited In *Lots of Parking* p.118
Right: Area devoted to off-street parking in downtown Detroit, 1922. *Source*: *Insurance Maps of Detroit, Michigan* (New York Sanborn Map Co. 1921) as cited in *Lots of Parking* p. 64

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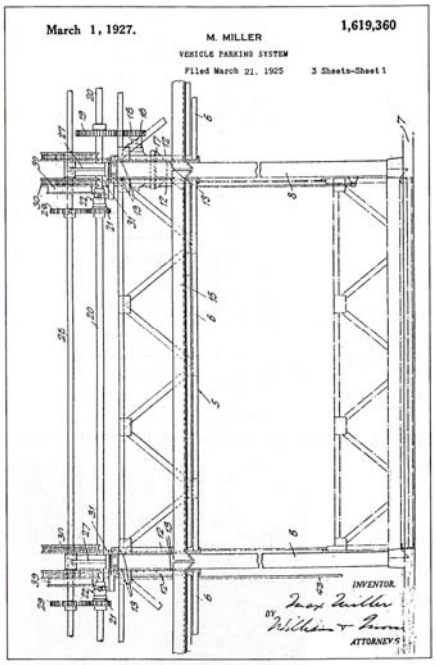
[6] Jackle 6

[7] Smith, Wilbur and Charles Le Craw Jr. "Zoning Applied to Parking", *Transportation Quarterly*. 1947 p.14

By 1925, 20% of commuters drove to work in a private automobile[8], and inventors were already working on mechanical solutions to ease the congestion of parking lots.[9] The United States Conference of Cities declared parking, "the most widely discussed and relevant issue in cities today"[10], and the House of Tomorrow featured a two-car garage.[11] America was smitten by the automobile.



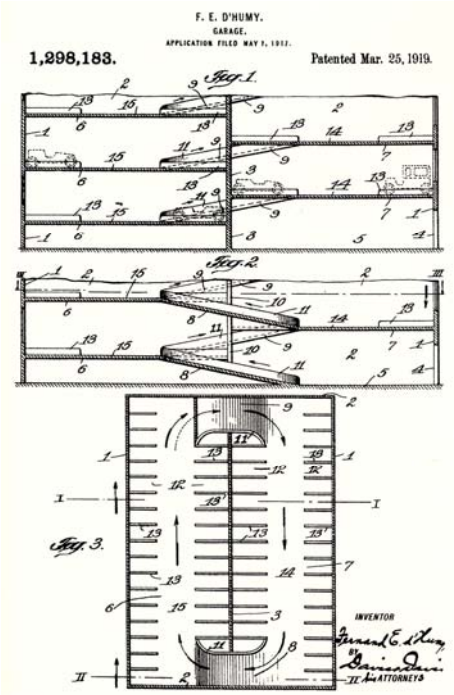


Figure 2.2
Left: First auto mechanical parking device, invented by Max Miller. *Source:* "Mechanical Parking: The New Generation", *Parking.* May 1992 p. 28
Right: In 1919, Fernand E. d'Humy obtained utility patent 1,298,183, the first of his several parking garage patents. *Source: Lots of Parking* p.129

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[8] Upham, Charles M. "Parking in Washington D.C.", *Transportation Quarterly*. 1954 p.37

[9] For example, in 1925 Max Miller invented the first mechanical parking device in the United States for a parking lot in New York. (Harding, Wayne. "Mechanical Parking: The New Generation", *Parking.* May 1992 p.28)

[10]Guiney, Anne. "Parking Structures", *Architecture* February 2001 p.78

[11] The House of Tomorrow was designed by Norman Belle Geddes for the 1931 World's Fair. (Guiney, Anne. "Parking Structures", *Architecture* February 2001 p.78)

By the mid-1930's the mechanical garage[12], which seemed so full of promise a decade earlier, was being replaced by the multi-story "cage garage"[13]. The principle advantage of the cage garage was its open deck design. There was no envelope, and subsequently, no ventilation or fire protection systems. This in turn considerably lowered construction and maintenance costs, making the cage garage an attractive option for parking developers. The 1930's saw two other critical events in parking: the appearance and widespread use of the parking meter[14], and a legal construct of parking. "In passing judgment, the court defined 'storage' as a function in which a business assumes responsibility for theft and damages from weather and physical injury, but 'parking' did not involve such responsibility."[15]

The years leading up to World War II brought tremendous change to the parking industry. In response to a wide variety of abuses, the city of Philadelphia passed the Parking Lot Ordinance of 1941, requiring that

> Parking operations be licensed and a full description of each lot or garage be made a matter of public record. License fees varied according to size of operation. Barriers (brick or concrete walls or wire fencing on metal posts) were required around the perimeters of lots larger than 2,500 square feet, with their height to reflect the material used. No driveways were to be over 30 feet wide, and their number was restricted according to the

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[12] "The early technologies, however, eventually proved unsatisfactory. Installation costs were high, mechanical and electrical malfunctions were common, and, perhaps most damning, these mechanical garages did not satisfy the demand for speedy service during peak traffic flows." (Jackle 130)

[13] The "Cage Garage" was the first open-deck parking garage, developed in 1933 by Sam Elliot in Boston, Massachusetts. (Jackle 131)

[14] The first parking meters were installed in Oklahoma City, Oklahoma in 1935. By 1938, 85 cities in 26 states, were using approximately 24,000 meters. By 1960, meters had spread to every state and 87 other countries. (Jackle 38-39)

[15] Jackle 125

> length of the street frontage. Signs bearing the operator's and the property owner's names and the parking lot rates applicable were to be clearly posted at all entrances. Prices posted at 8 AM each day were to apply unchanged for 24 hours. Lots used after dark had to be floodlit. The Philadelphia Ordinance further required signed customer consent before cars could be moved from lot to lot, and a record of all parked cars had to be kept according to license plate number. Operators were required to post bond against instances of car damage. It was made illegal for lot operators to park cars on public sidewalks. Philadelphia's Department of Public Safety was charged with determining the maximum car capacity for each operation. In addition license applicants had to secure approval from the Zoning Commission, the Bureau of Highways, the Building Inspector's Office, the Fire Marshall's Office and the Electrical Bureau.[16]

Additionally, land owners were still finding commercial parking lots to be more profitable than new development, which would have contributed to the mounting parking problem. Downtowns of almost every city in the country were systematically eaten away by both surface and garage parking. It was this pressure which led San Francisco to open the Union Square Underground Parking Garage, at twice the cost of a standard garage in, 1942.[17] The city justified the funds for the new deck, claiming the continuity of the urban fabric was worth the additional expense of excavating and constructing an underground deck. In a similar vein, the industry as a whole was trying to increase the efficiency and density of surface lots through newly designed automated systems.[18] At the dawn of

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[16] Jackle 75-76

[17] Guiney, Anne. "Parking Structures", *Architecture* February 2001 p.78

[18] In 1939, E.W. Austin filed a patent for a variation on the early automated garage which was granted in 1942. In 1941 O.A. Light filed a patent (which was never granted to him) for a 3 car mechanical stacking system, which is the premise for current lift models. (Harding, Wayne. "Mechanical Parking: The New Generation", *Parking.* May 1992 p.28)

World War II, parking was becoming more regulated and less of a disruption in the traditional city.

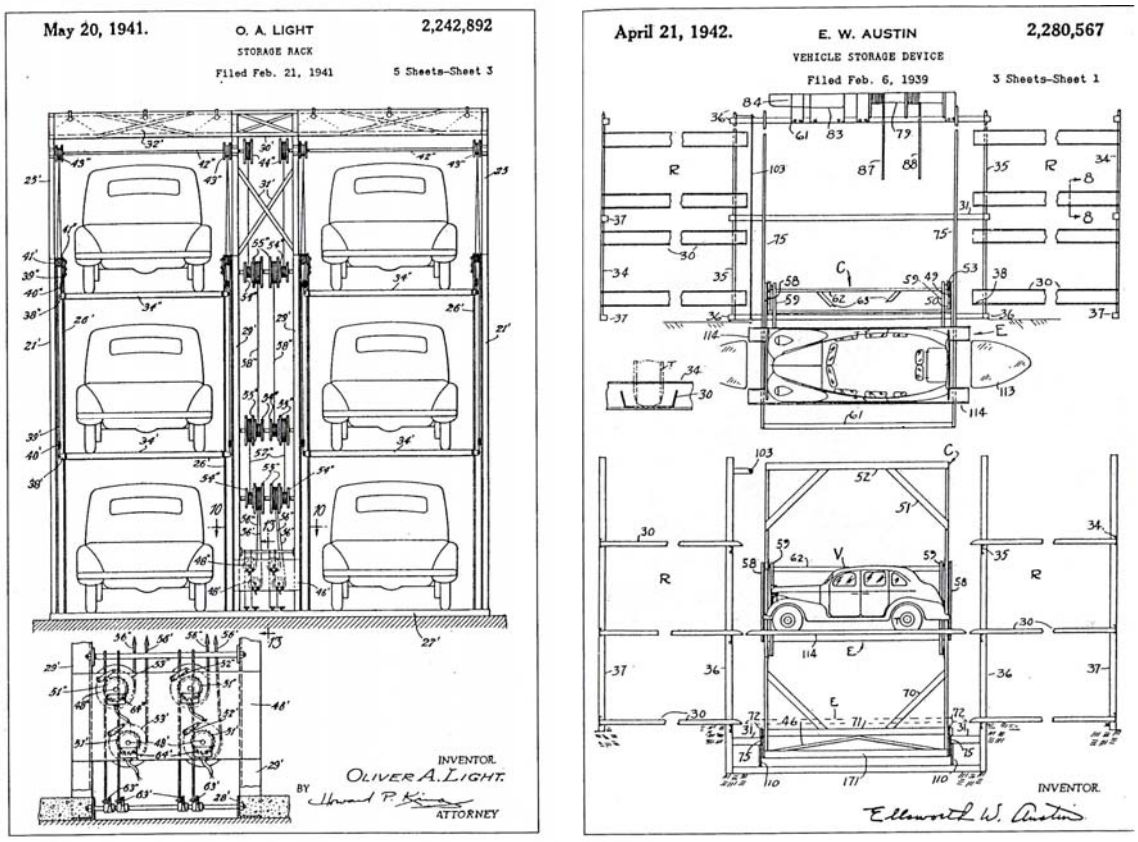

Figure 2.3

Left: O.A. Light's patent to stack 3 Cars. *Source*: "Mechanical Parking: The New Generation" *Parking*, May 1992 p.28

Right: E.W. Austin's 1942 patent for an automated garage. *Source* "Mechanical Parking: The New Generation" *Parking,* May 1992 p.29

WORLD WAR II – FEDERAL HIGHWAY ACT OF 1956

The picture changed radically after 1945. Cities began passing legislation to expand the roles of the car and the parking lot, rather than restrain them. Twelve states had already implemented specific off-street parking requirements in their zoning ordinances[19], and by 1946 over 90% of Americans were traveling by car. Downtown parking was in such demand that it was estimated 30% of traffic during shopping hours was devoted to the quest for a parking space.[20] In response to the increasing demand, more land and municipal funds were devoted to parking. By 1948, parking had become the "most important single problem facing the Central Business Districts of large cities"[21] and was the subject of numerous publications.[22] In perhaps the most definitive work on parking lots published during this the period, Wilbur S. Smith and Charles LeCraw Jr. have painstakingly portrayed the typical surface parking lot.

> [They] undertook in 1948 to describe the typical commercial parking lot, basing their observations on a survey of 25 lot operators in selected cities across the country. The typical lot occupied a rectangle of some 25,000 square feet, with about 10 percent of the total devoted to automotive services, especially the sale of gasoline and lubricants. The typical lot could accommodate 112 cars if parked by attendants backing them into slots angled at 90 degrees and 92 cars if self-parked by customers heading them into slots angled at 45 degrees. By

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[19] Mott, Seward H., Director. "Commercial Parking in Residential Areas", *Urban Land Institute Technical Bulletin No. 9*. June 1948 p. 13

[20] "Parking Jam: US Cities Build and Dig Garages as Traffic Chokes a Thousand Busy Streets", *Architectural Forum*. September 1946 p. 8

[21] Mott, Seward H., Director. "Commercial Parking in Residential Areas", *Urban Land Institute Technical Bulletin No. 9*. June 1948 p. 5

[22] These included the New Jersey Turnpike Authority's *Traffic Design of Parking Garages*, several *Urban Land Institute Technical Bulletins* and a number of traffic engineering studies.

backing cars into position, a shorter turning radius was needed, thereby requiring less aisle space. The typical lot was surfaced in asphalt and was lighted for nighttime operation. It was located on leased land and was 12 years old. From respondent questionnaires, Smith and LeCraw analyzed operating costs. Land owned was valued from 43 cents to $6.09 a square foot, or $3.50 on average. The largest single operating expense, however, was labor: employee salaries varied from 1.1 to 18 cents per car parked, or on average 7.1 cents. Insurance costs ranged upwards of $2,500 annually but were pegged, on average, at 14 cents per car parked. Property taxes ranged upwards of $15,000 annually but averaged 8 cents per car parked. Finally, annual maintenance costs ranged up to $3,200, municipal license fees to $100, and utility costs to $25. Revenues varied widely. The lowest annual gross income reported was $7,000 a year, or 9 cents per car parked. This lot [was] located in a small city…The highest reported gross income was $131,000 or 93 cents per car parked. This lot [was] was located in a large city…The average lot produced an annual net income of $53 per parking space, or 7.9 cents per car parked.[23]

[23] Jackle 52-53.

Figure 2.4
Automobile parking garages and lots in downtown Indianapolis, 1942. *Source*: Sanborn Map Company, *Sanborn Insurance Maps of Indianapolis Indiana* (New York 1942) as cited in *Lots of Parking,* p. 134

By 1951 a National Parking Association had been formed [24], nearly 200 cities had adopted minimum off-street parking requirements in their zoning, an increase of over 275% over six years [25], and a variety of garage types had begun to develop. The distinguishing feature of a garage was its ramp system or vertical circulation. In 1951 there were three primary ramp systems in use: spiral, continuous and opposed, and modified split level. These systems were easily adaptable to particular site constraints and could also be modified for endless variation.[26]

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[24] Jackle 88.

[25] Jackle 77.

[26] Jackle 141.

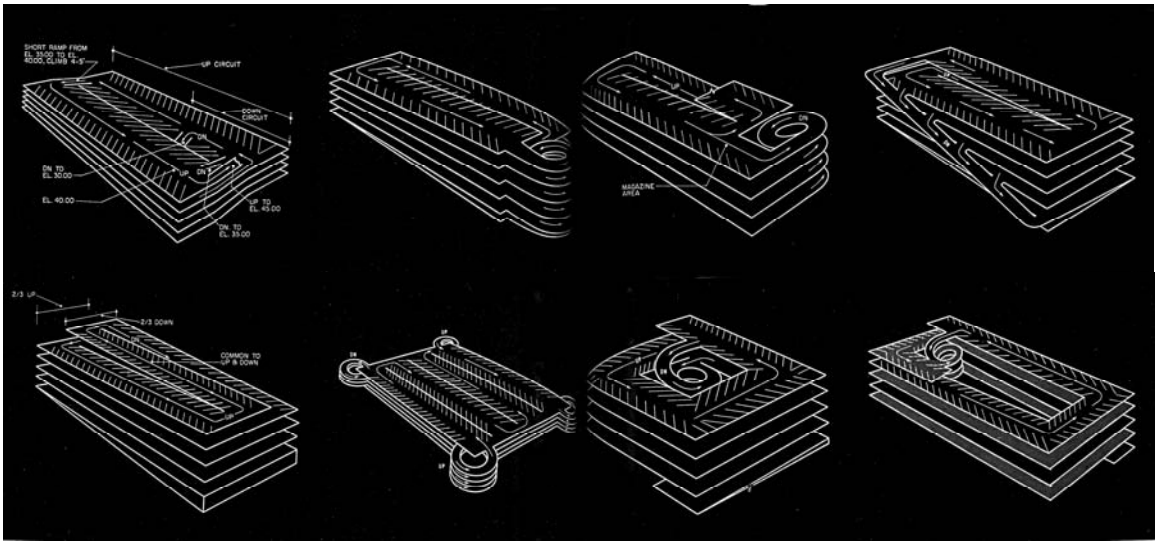

Figure 2.5
Various parking garage layouts and ramp systems. *Source:* "Planning a Downtown Parking Deck", *Architectural Record*, October 1992. p. 178-181

The mechanical garage also enjoyed a brief resurgence in the widely discussed Rotogarage:[27]

> Rotogarage's ingenious design for a mechanical parking tower on clamorous 34th Street between Sixth and Seventh Avenues in New York is brand new. Its parking floors are actually a stack of turntables set on a core of four elevator shafts. City motorists will drive in on a clear street floor, leave their cars before one of the four elevator doors, turn the ignition off, and get out, leaving the cars on completely locked if they wish. A dolly will emerge from the elevator, lift a car a few inches off the floor, and pull it into the elevator. The elevator will carry the car upstairs to one of the rotor floors which has an empty slot on its turntable – and while the elevator is rising this rotor will be revolving to present

[27] It seems throughout the history of parking, the mechanical/automated facility threatens widespread use every ten years, only to quietly disappear once the technology fails under pressure. This pattern continues to the present day.

its vacant spot before the elevator door. The elevator will stop, the dolly will run the car out of the cab and drop it on the rotor,

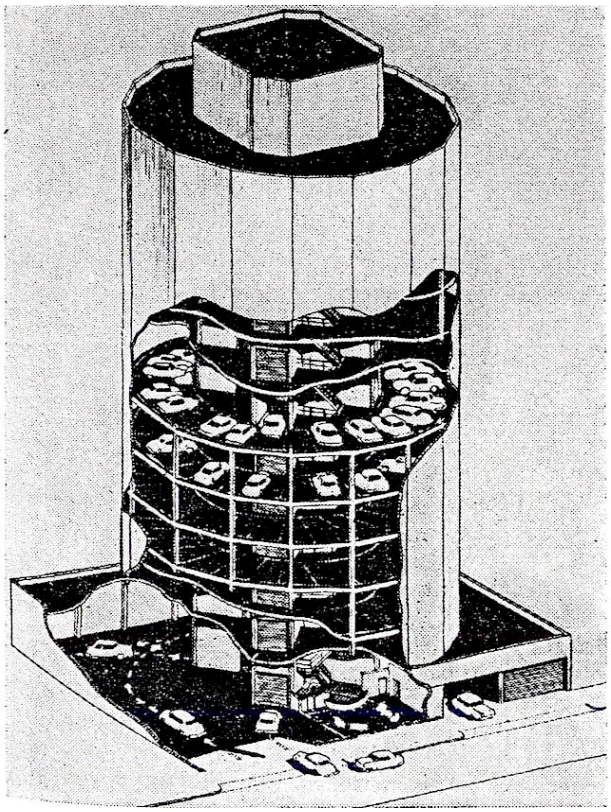

Figure 2.6
The Rotogarage uses only one ring. A dolly lifts cars into one of four elevators. *Source:* "Rotating Garages Provide Maximum Parking Space on a Small City Lot", *Architectural Record*, October 1955. p.247

then the elevator will either unpark another car which has been called for and take it down or return below empty. The time elapsed from when the elevator doors open to receive on car, the car is stored upstairs, and the elevator returns to pick up another will average one and a half minutes.

Other automatic parkers have been developed and are in use which handles all cars mechanically by dollies on elevators, but those designs in use have a common weakness: if any part of the mechanism goes out of order, a certain number of the parked cars cannot be unparked until it is fixed. It is highly improbable that cars ever would be frozen in a rotogarage. This design sidesteps the weakness by making all the cars accessible to all the elevators by means of turntables. Even if three of the four

> elevators should go out of commission simultaneously, the system is not immobilized. One elevator can clear the entire building. Another place of possible mechanical failure, the motors which revolve the turntables, is diminished as a danger by the design of the rotor mechanism. Only 6 h.p. are required to move a turntable fully loaded with 28 cars (gross wt. 200,000 lbs). Actually, four 2 h.p. motors are provided in the design, by even if they go out the turntable may be turned practically in emergency by manpower at a slower speed than usual. Engine failure freezes nothing unless all elevators go out.[28]

However, like its predecessors, the Rotogarage was never widely adopted.

The early 1950s were a period of economic prosperity and relative domestic stability. The American dream of a single family detached home with a two car garage away from the evils of the city became a reality for millions, due in part to new suburban infrastructure created through the Federal Highway Acts of the 1940s and 1950s. The most famous of these acts was passed in 1956; its ambitious program was often referred to as "the greatest public works project in history". While the act built on legislative precedents, such as the Federal-Aid Highway Acts of 1938, 1944 and 1954, it differed from its predecessors in terms of scale. President Eisenhower envisioned broad ribbons of roadway crossing the country and his idea was in complete accord with many Americans who were coming to value individual mobility as a cornerstone of the American way of life.

And what could be more American than ample parking at every destination off the interstate? In 1952, traffic engineers Mogren and Smith quoted a delighted mayor as saying, "We consider zoning for parking our greatest advance…It is working out

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[28] Architectural Forum Staff. "Rotogarage parks 400 cars on a plot 100 x 125 feet with 11/2 minute delivery", *Architectural Forum*. February 1951 p.108-109

exceptionally well, far better than we had expected. In brief, it calls for all new buildings to make ample provision for parking space required for its own uses."[29] Parking lots, particularly in newly developed suburban locations, were expanding not only the number of cars stored, but also their physical dimensions. Automobiles themselves had grown since their introduction at the turn of the century, necessitating larger stalls, and more maneuvering room. "Wide aisles, ample berths, and convenient footways, for example, result in greater ease, efficiency and safety in entering and leaving."[30] Small lots were considered to be those which housed 150 to 200 cars. A standard layout for a 160 car parking lot measures 120'x360', or 43,200 ft^2, roughly equal to one acre. Again, these were the ideal, smaller lots, but in some places they still did not satisfy the demand.

In 1925, 20% of morning commutes were made in an automobile; by 1954 the number had doubled. In 1946, 12 states had specific provisions in their zoning for off-street parking; by 1953 the number had grown to 33.[31] In 1955, a journalist expressed what many thought. "Next to winning the peace, America's number one problem seems to be winning the parking problem…It has been growing steadily worse."[32] The automobile was dominating American lifestyle and landscape.

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[29] Shoup, Donald. "The High Cost of Free Parking", *Journal of Planning Education and Research*. Fall 1997 p.12

[30]Mcgillis, J. T. "Municipal Parking – Detroit", *Transportation Quarterly*. 1958 p.543-558

[31]Upham, Charles M. "Parking in Washington D.C.", *Transportation Quarterly*. 1954 p.36-41

[32] Jackle 135.

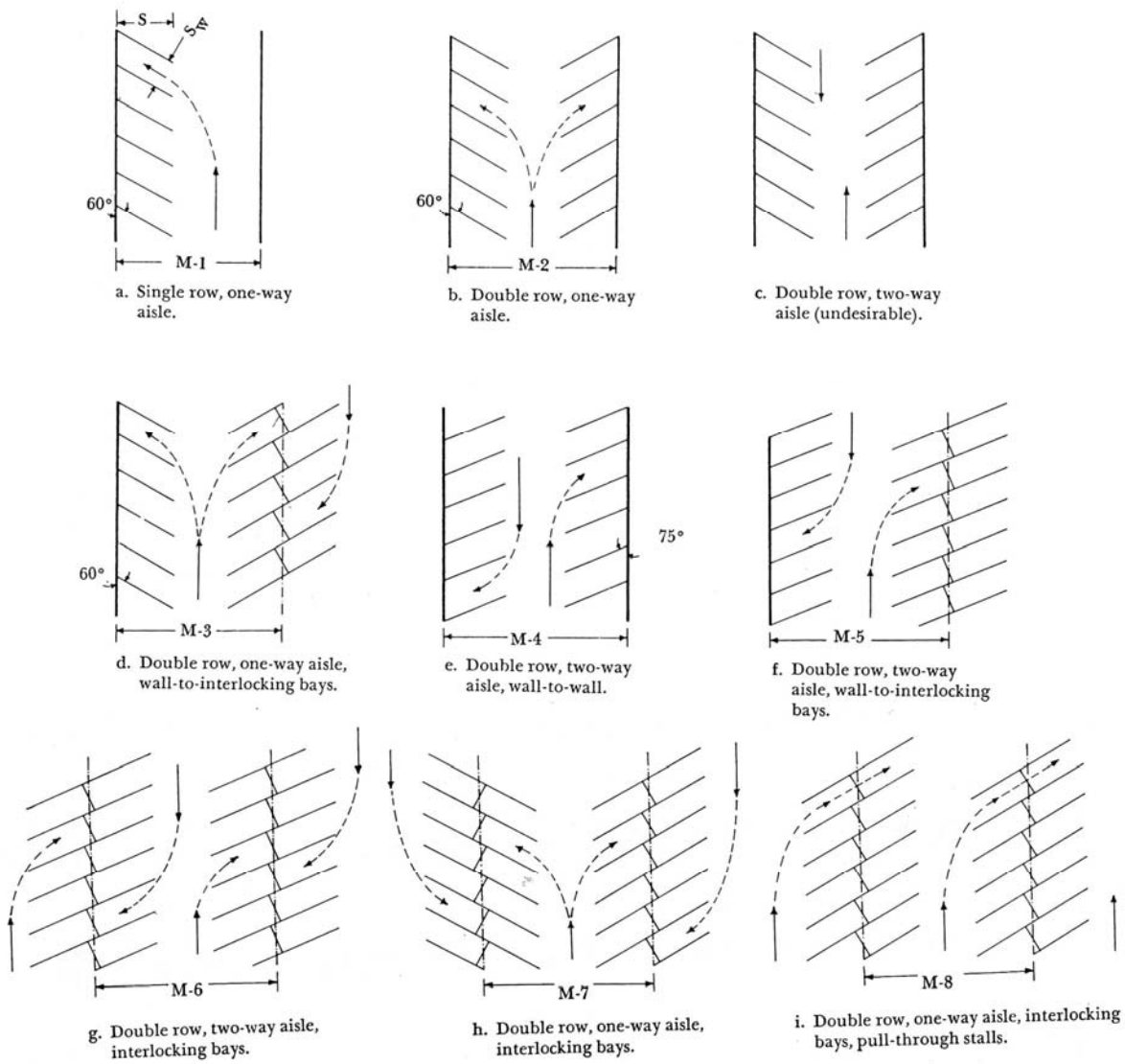
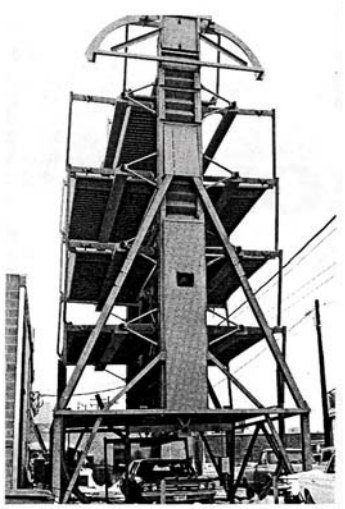


Figure 2.7
Various parking stall and aisle layouts. *Source:* "Parking Lot Design Standards", *Transportation Quarterly*, 1973 p. 462-463

THE FEDERAL HIGHWAY ACT OF 1956 - THE ENERGY CRISIS OF 1977

The 1960's, like the preceding 3 decades, saw the introduction of a variety of automated parking machines, which were as poorly received as their forerunners. The most famous of these innovations were the Vert-a-Park[33] and the Speedpark[34], as well as the single and double car lifts, which were produced by a variety of manufacturers.[35] The problem was that Americans enjoyed knowing their cars could be retrieved quickly and easily at any time. With the expanse of land now available as a result of the Federal Highway Act, the space saving virtues of automatic parking were often not worth the inconvenience. Larger lots also made self-park systems, which required wider aisles and larger stalls, more affordable and subsequently more popular.



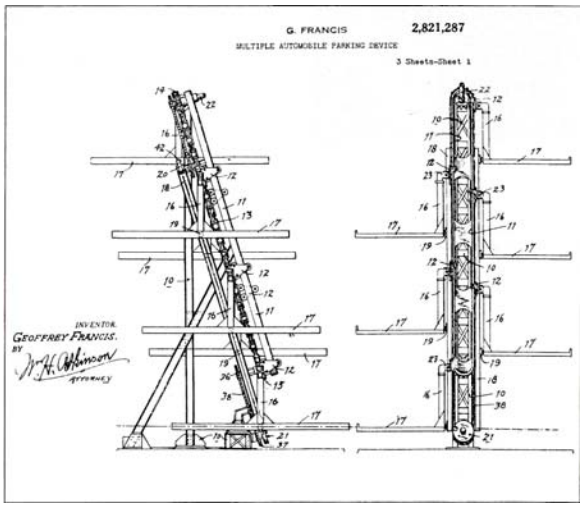


Figure 2.8
Left: A 10-car prototype of the Vert-A-Park *Source:* "Mechanical Parking: The New Generation", *Parking*, May 1992 p.31
Right: Geoffrey Francis' model similar to Vert-A-Park *Source:* "Mechanical Parking: The New Generation", *Parking*, May 1992 p.31

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[33] The Vert-a-Park was designed and patented by Bob Lichti in California in 1961. Harding, Wayne, "Mechanical Parking: The New Generation", *Parking.* May 1992 p.30

[34] "Parking: The Crisis is Downtown", *Architectural Forum*. February 1963 p.100-103

[35] The major brands of automatic lifts were: DublPark, Duo Park, Park Plus, Space Maker and Space-o-matic. Sculle 107.

The elimination of parking attendants in favor of self-park also saved close to 75% in operating costs between 1955 and 1960 alone.[36] Edwin Roth's combination gate arm, cash register and detector made self parking even more attractive and profitable.[37] However, the proliferation of parking was not without consequence. Take, for example, the outcome of the 1961 zoning changes in Oakland, CA, which mandated one off-street parking space for every unit in multi-family dwellings. "As a result of the parking requirement, the number of dwelling units per acre in new developments fell by 30% and the construction costs per dwelling unit rose by 18%...housing investments fell by 18%. Land values fell even more (33%) because the land was suddenly burdened with a new requirement to provide parking that residents did not pay for."[38]

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[36]Devlin, George A. "Automatic Parking Devices", *Transportation Quarterly*. 1960 p.77-84

[37] Jackle 220

[38]Shoup, Donald , "An Opportunity to Reduce Minimum Parking Requirements", *American Planning Association Journal*. Winter 1995 p.25

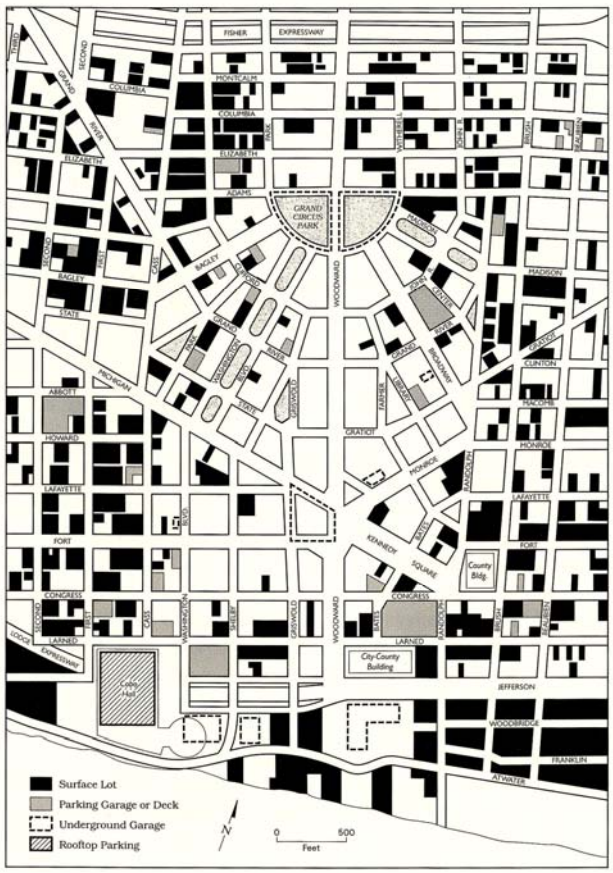

Figure 2.9

Area devoted to parking in downtown Detroit 1965. *Source*: Adapted from A. George Basmadjian, *Parking Facilities Manual: Report of TALUS* ([Detroit]: TALUS, 1967), 10 as cited in *Lots of Parking* p. 174

By 1965 the treatment of choice for parked cars was concealment, be it through garages, landscaping or excavation.[39] Conventional thought turned back to angled parking as the optimum layout[40], and publications like Architectural Record and the New Jersey Turnpike Authority's Traffic Design of Parking Garages promoted "good garage

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[39] Jacobson, Leo H. "How Detroit is Solving its Parking Problem", *Transportation Quarterly*. 1966 p.240

[40] As opposed to perpendicular parking, which had been touted a decade earlier. This debate, 90 degrees vs. 45 degrees, will continue through to the present day, with "conventional wisdom" changing every few years.

guidelines". They recommended; angled stalls, clearspan construction, clearly defined one-way traffic flow, elevators located near destinations and express exit ramps.[41] The primary goal, especially where parking was associated with retail, was not the storage of the maximum number of vehicles, but their speedy and efficient movement throughout the facility. "The primary objective of parking lot layout for shopping should be not the greatest number of parking places, but rather the greatest possible turnover of cars during a given period of time. For this reason, 45° angled parking is strongly recommended for parking areas catering to shopping."[42]

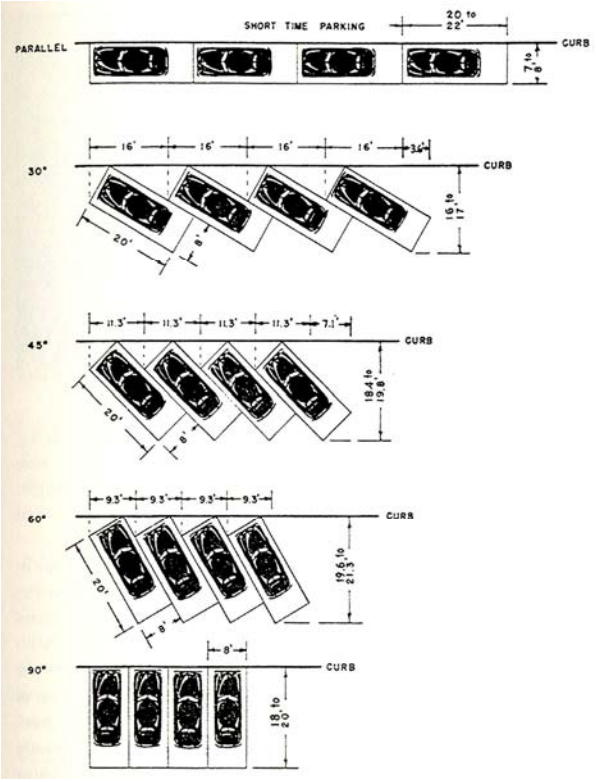

Figure 2.10
Parking angle and curbside parking capacity. Adapted from J. Ross McKeever, *Shopping A Centers Re-Studied: Emerging Patterns and Practical Experiences*, Technical Bulletin n.30 (Washington DC: Urban Land Institute, 1957), 39 as cited in *Lots of Parking* p.33

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[41] Rich, Richard "Planning a Downtown Parking Deck", *Architectural Record*. May 1965 p.178

[42]Heyman, Joseph H. "Parking Trends and Recommendations", *Transportation Quarterly*. 1968 p.251

It was also becoming clear that in meeting the perceived maximum demand, a large percentage of parking frequently remained vacant. This was noted, possibly for the first time, in the second Planning Service Advisory Report (PSAR) of 1971, where "…requirements tend to be arbitrary, at time insufficient, other times excessive…a 1965 survey of shopping center parking lots in the busiest day of the year [between Thanksgiving and Christmas] showed requirements were substantially higher than actual demand."[43]

The 1970s featured a return to perpendicular parking and the implementation of even wider drive aisles[44] at the suggestion of the Environmental Protection Agency, which set forth new standards on July 1, 1975. These "…necessitated new standards for interfloor travel, parking angles in stalls, stall width, and entrance design and operation…wider bays resulting in large lots for garages were recommended."[45] The EPA also discouraged parking and automobile use in remaining downtown centers because of air-quality issues. It was as though the federal government was endorsing large lot, wide bay garages in suburban settings. Additionally, by the mid 1970s, publications and advisors were no longer recommending standard models for parking lots, particularly parking garages. "Parking garage construction and management became elaborate collaborations of traffic engineers, urban planners, building contractors and entrepreneurs combining numerous carefully proposed and selected factors rendering each resulting structure unique."[46] They were, however, recommending

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[43] Shoup, Donald. "An Opportunity to Reduce Minimum Parking Requirements", *American Planning Association Journal*. Winter 1995 p.20

[44] The new minimum was 11' (Kanaan, George and David K. Witheford "Parking Lot Design Standards", Transportation Quarterly. 1973 p.461)

[45] Jackle 146

[46] Jackle 136

flexibility, assuring that a new garage, given the changing dimensions of automobiles, would remain operable throughout its lifetime.[47] "Since the life expectancy of a garage is 40 plus years, compared with an automobile of about 8 years, it is apparent that 80 percent of all cars which will park in a garage completed in 1975 have not been designed yet."[48] Parking was beginning to be viewed more critically.

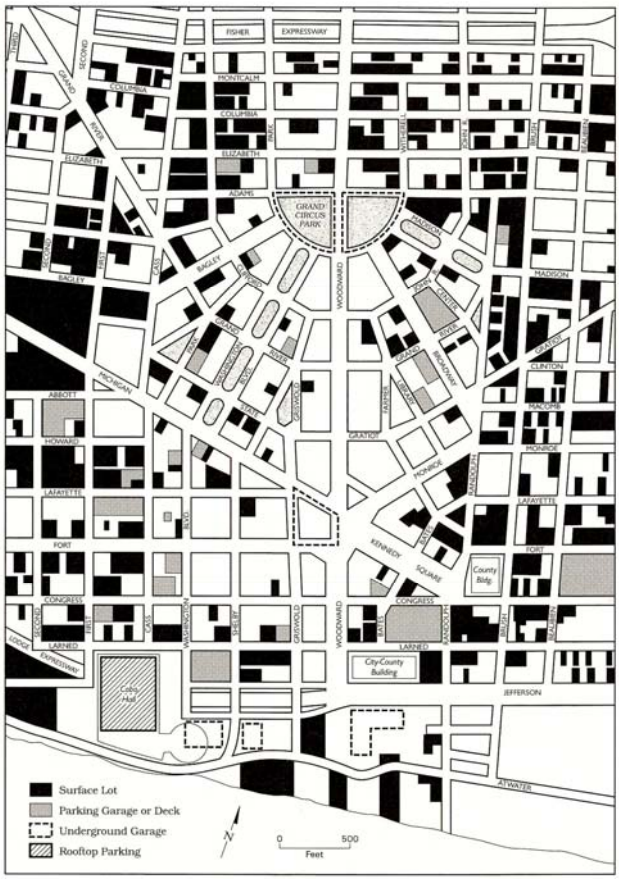

Figure 2.11
Area devoted to parking in downtown Detroit, 1975. *Source*: Adapted from Kenneth W. Karket Jr., *Regional Parking Inventory and Analysis: Part I – Supply and Costs* (Detroit: Southeast Michigan Council of Governments, 1975), 38, 41 as cited in *Lots of Parking* p.177

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[47] In the mid to later 1970s, given the social/economic consequences of the energy crisis, most people believed the automobile would shrink and the compact car would dominate the American market. Ironically, the opposite proved true, but garages built during this period are still in use because of the flexibility of clear span construction.

[48] Devlin, George A. "Parking Design", *Urban Land.* May 1975 p.4

From 1965 to 1977, the standard ordinance for off-street parking serving a shopping center was 5.5 spaces per 1000 ft² of gross leaseable area (gla). If a center was 1,000,000 ft², it was required to provide 5,500 parking spaces, roughly 50 to 60 acres of asphalt.[49] This standard, based on the proposed guidelines in the Urban Land Institute Technical Bulletin 53 – Parking Requirements for Shopping Centers, was more than sufficient. A study conducted by Barton-Aschman Associates in 1977, based on a survey of thirty two representative shopping centers throughout the country, illustrated that the current parking standards bordered on excessive.

> Less than 8% of the parking accumulation counts exceeded or equaled the current standard of 5.5. 39% of the parking demand ratios determined fell between 4.0 and 5.0, and nearly 32% were less than 4.0. The average parking demand ratio of all 141 parking accumulation counts was 4.4. This is quite significant considering that study days covered not only the highest sales and traffic days of the year, but also covered all the Saturdays before Christmas which were in the seven highest sales days of the year…[furthermore] the 5.0 ratio was exceeded for probably no more than three hours during the day, or less than 0.1% of the approximately 3,600 hours of operation of the regional centers during the year.[50]

Shortly after the report was published, marginal changes were made zoning ordinances. To this day a majority of shopping centers still maintain a ration of 4.0 spaces to 1000ft² gla.

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[49] Gem, Richard C. "Parking Demand at the Regionals", *Urban Land.* May 1977 p.4

[50] Gem, Richard C. "Parking Demand at the Regionals", *Urban Land.* May 1977 p.7-8

AFTER THE ENERGY CRISIS

Given the economic climate of the late 1970s and early 1980s America, it is not surprising that little progress was made in the world of parking during this period. Few garages were built; no major legislation was passed, and there was a virtual hole in parking literature. It was not until the late 1980s that parking resurfaced as an important issue for public consideration. In 1987, the Parking Market Research Company published a report entitled "What's Going on Out There?", surveying and summarizing the current conditions of parking facilities:

> Space is at such a premium, developers are forced to go up (or down) as the only way to create more space where land is…costly and unavailable. Parking decks are being shoehorned into any kind of narrow area, frequently replacing grade level surface lost with multilevel parking decks which provide space for five times as many cars in the same size land area…A typical parking garage has 964 spaces and 4.6 levels; is free standing and made of concrete; took 24.11 months to build at a cost of $7,205,777 or $7468 per space; and has a sloping-deck flow system that provides for parking and driving on decks and ramps…Features are likely to include closed circuit T.V. and high-pressure sodium lighting for safety and security and a computer system for keeping track of garage users. The top five "user groups" for parking garages, according to the study, are: office workers, for whom 64.2 percent of garages are being built, shoppers, 55.1 percent, hotel guests 12.5 percent, residents of multifamily dwellings, 10 percent; and hospital workers and patients, 7.5 percent.[51]

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[51] McCuller, Michael "Garage Mechanics", *Progressive Architecture*. November 1987 p.107

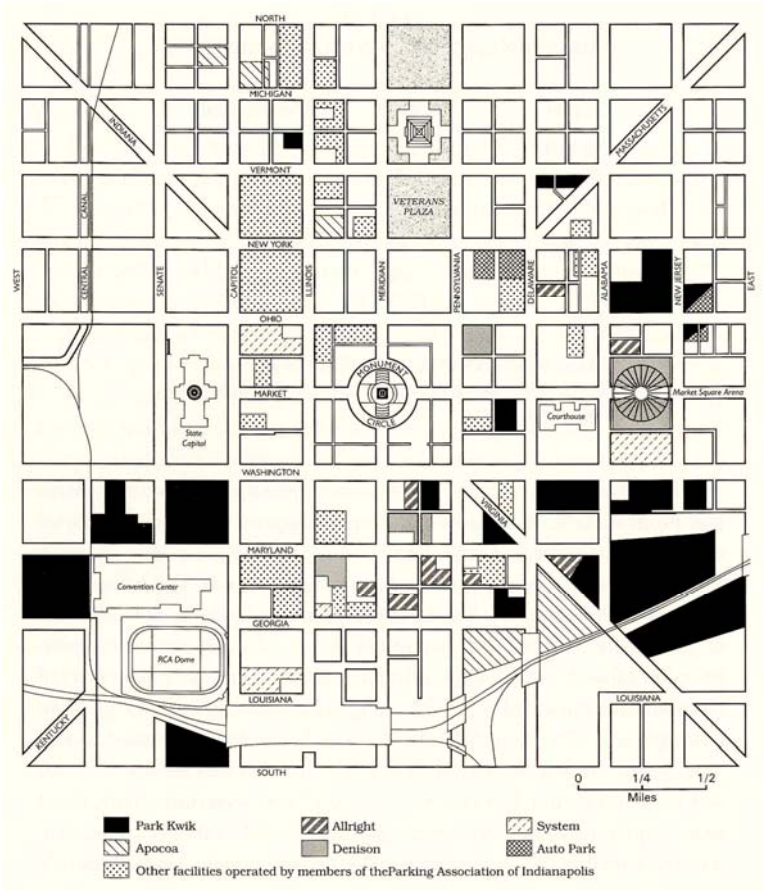

Figure 2.12
Parking chain operations in downtown Indianapolis, 1989. *Source:* Member address list and map (Indianapolis: Parking Association of Indianapolis, 1989) as cited in *Lots of Parking* p. 60

The report focused on garages as a more efficient land use, in contrast to the surface lots they frequently replaced. This sentiment was also reflected in the patenting of O.A. Light's three-car stack [52] and the strong recommendation for garage construction on sites where floor area ratios (FARs) exceeded 0.45.[53] The prevailing attitude in the discourse was clear. "With the need to maximize land use, surface parking lots are no longer economically viable, nor are they considered an acceptable urban planning

[52] O.A. Light invented the 3-car stack in 1941, but never patented it. When it was patented in 1987, it was done by William Gooch and William van Stokes. Harding, Wayne "Mechanical Parking: The New Generation", *Parking.* May 1992 p.31

[53] Smith, Shelly L. "The Stuff of Parking", *Urban Land*. February 1990 p.36

option."[54] By 1992 there were 1.1 vehicles for every licensed driver in the United States, and no one wanted to see them.[55]

It seemed that no one wanted to pay to park them either. In the 1990 Personal Transportation Survey (NPTS), "motorists reported free parking for 99% of all automobile trips…and 95% of all automobile commuters said they parked free at work."[56] Only it was far from free. The cost of "free parking" was passed onto the motorist in a variety of ways. In general, "95% of all parking structures lose money in their first few years of operation and some never become feasible as independent projects…losses in parking garages are usually built into the office rents in advance."[57] This in turn increased a business's expenses and employers have no choice but to deduct the cost of parking from the salaries they pay their employees. The effect trickles down even further at shopping centers, where "the owner charges tenants higher rents and common area maintenance fees. In turn the tenants charge consumers higher prices for their services and merchandise."[58] This practice has prompted a number of individuals to closely examine the practices of "bundled parking"[59] and hidden fees, in the hopes of creating a more transparent and equitable system. The most revolutionary step to counterbalance "free parking" was taken by California in 1995, through the implementation of the parking

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[54] Harriman, Marc S . "Stacking the Decks", *Architecture*. December 1991 p.80

[55] Shoup, Donald. "An Opportunity to Reduce Minimum Parking Requirements", *American Planning Association Journal*. Winter 1995 p.20

[56] Ibid p.14

[57]Feagins, Thomas J. "Downtown Parking: Prevailing Popularity Defines Planning Practices", *Urban Land*. February 1985 p.22

[58] Dorsett, John W. "The Price Tag of Parking", *Urban Land*. May 1998 p.66

[59] Bundled parking is the practice of including a parking space and its maintenance fees in the cost of leasing an associated space. Unbundling permits renting without the benefits or costs of the parking space.

cash-out program, developed by Donald Shoup from the University of California, Los Angeles.

> "Parking cash-out program" means an employer funded program under which an employer offers to provide a cash allowance to an employee equivalent to the parking subsidy that the employer would otherwise pay to provide the employee with a parking space…Parking subsidy means the difference between the out of pocket amount paid by an employer on a regular basis in order to secure the availability of an employee parking space not owned by the employer and the price, if any, charged to an employee for use of that space. (California Health and Safety Code Section 43845)
> The city or county in which a commercial development will implement a parking cash-out program…shall grant to that development an appropriate reduction in the parking requirements otherwise in effect for new commercial development. (California Health and Safety Code Section 65089)[60]

The program has since been adopted in several other states, but has failed to gain widespread popularity in part because Americans value individual mobility so highly. Additionally, most cities do not have strong enough or large enough mass transportation systems to adequately substitute the convenience of the automobile.

The early 1990s saw another attempt at automated parking. Here the variation was subterranean concealment [61], the most widely discussed models being Angelo Fusaro's SC-2 and ST2/C:

> The ST2/C is an environmentalists dream. [It] is entirely underground. Grass or flowers can be planted on the roof, or by using concrete and tiles it can be turned into a busy courtyard.

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[60] Shoup, Donald. "An Opportunity to Reduce Minimum Parking Requirements", *American Planning Association Journal*. Winter 1995 p.15-17

[61] Heyman, Joseph H. "Mechanical Parking: The New Generation, Part II", *Parking.* June 1992 p.46

For those who appreciate beautiful lawns and dislike the sight of garages and cars, the ST2/C hides everything but the grass. Cars can be retrieved by remote controls inside the house, office or elsewhere…In several installations, cars are parked beneath courtyards that pedestrians can use during the day. After work, the parked cars are elevated and driven away. The top of the ST2/C is sealed to prevent moisture from entering the parking chamber. Although it won't be the most used mechanical parking device of the '90s, it will emphasize what the parking industry is all about – cleaning up and beautifying the environment by getting cars off the street and parking them securely until they are needed.[62]

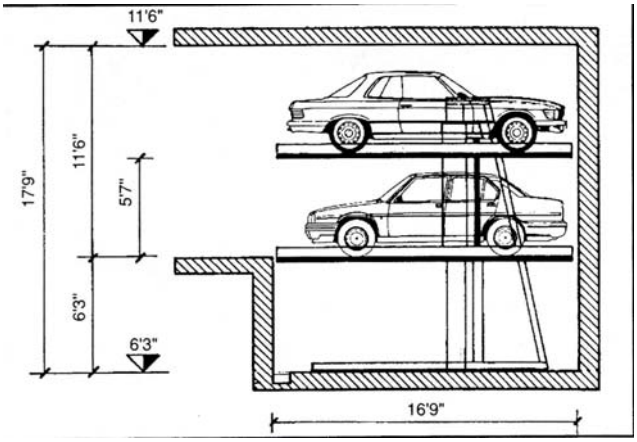

Figure 2.13
Fusaro's ST-2. *Source*: "Mechanical Parking: The New Generation", *Parking*, June 1992 p.50

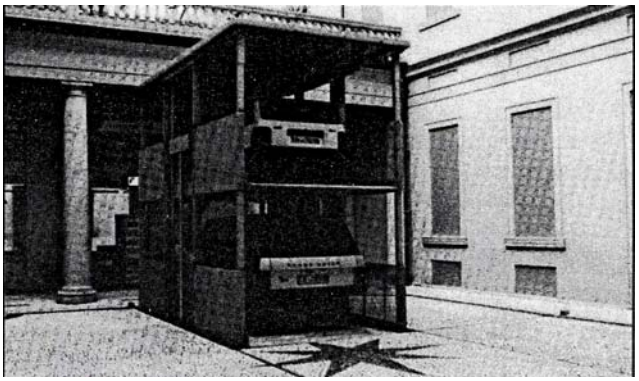

Figure 2.14
Fusaro's ST2/C. *Source*: "Mechanical Parking: The New Generation", *Parking*, June 1992 p.50

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[62] Heyman, Joseph H. "Mechanical Parking: The New Generation, Part II", *Parking.* June 1992 p.49

It remains uncertain if the new breed of subterranean automatic units will catch favor with the general public, but one suspects they will suffer the same fate as their automated predecessors.

Two new guidebooks codifying physical requirements for parking were also published in the 1990s: Dimensions of Parking in 1993 and The Walker Parking Consultants Guide in 1996.[63] Using these guidebooks, developers could roughly design their own parking facilities, bypassing extensive collaborations with traffic engineers, parking specialists and urban designers. However, developers were soon offered another option: paying not to build parking. Donald Shoup, the architect of the parking cash-out program, has written extensively on in lieu fees, which allow developers to pay the city a specified fee for every required parking space they do not provide. The city can then use this revenue to construct public parking spaces, strengthen mass transit or improve roadways. Although many cities offer developers the option of in lieu fees, some cities require it [64], at which point the in lieu fees become impact fees. Alan Altshculer and Jose Gomez-Ibanez define impact fees as

> mandated expenditures by private land developers required as a price for their obtaining regulatory permits, in support of infrastructure and other public services…The average parking impact fee for the U.S. cities in [this study] is $31 per square foot, which dwarfs the impact fees levied for all other public purposes. A 1991 survey of 100 U.S. cities found that the impact fees for all purposes (roads, schools, parks, water, sewers, flood control and the like) averaged $6.97 per square foot of office buildings. The average parking impact fee for office buildings is

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[63] Jackle p.150

[64] "Officials in these latter cities citied several reasons for requiring developers to pay the fees: to centralize parking facilities, put more of the parking supply under public management, encourage shared parking, discourage the proliferation of surface parking lots, emphasize continuous shop fronts, improve pedestrian circulation, reduce traffic congestion, and improve urban design." (Shoup, Donald. "In Lieu of Required Parking", *Journal of Planning Education and Research*. Summer 1999 p.309)

thus 4.4 times the average impact fee for all other public purposes combined. If impact fees reveal a city's priorities for public services, many cities' highest priority is free parking.[65]

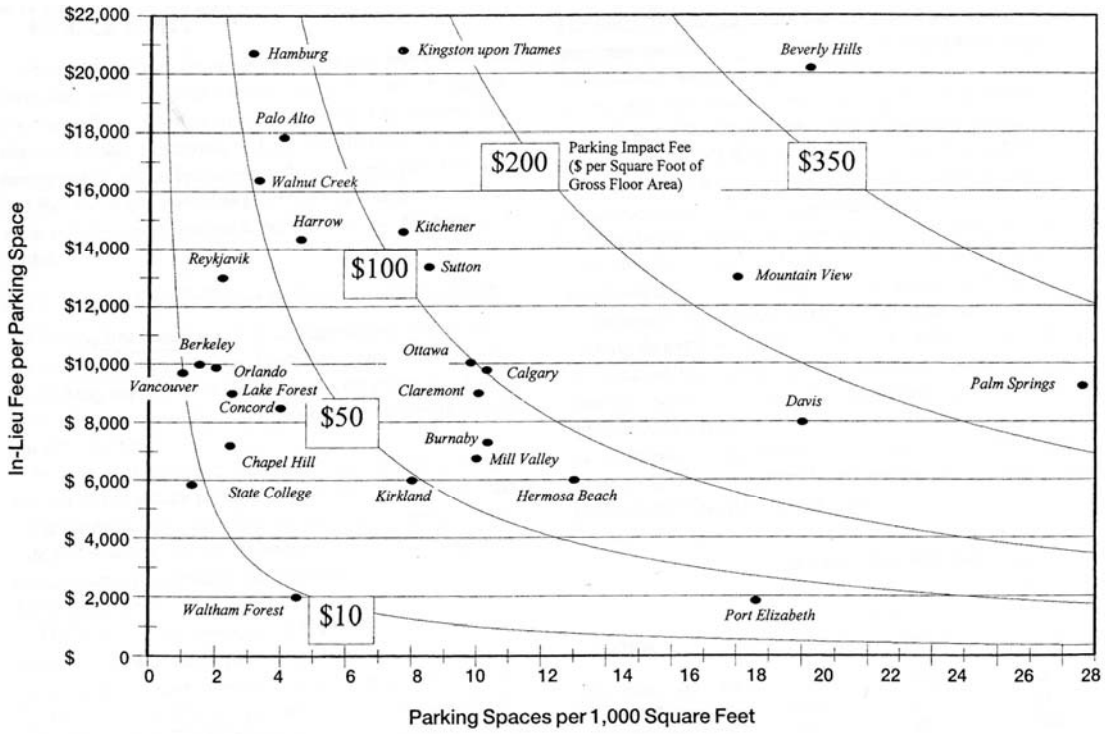

Figure 2.15
Parking impact fees as a function of parking requirements and in-lieu fees. *Source:* "The High Cost of Free Parking", *Journal of Planning Education and Research*, Fall 1997. p.7

This priority of parking should be clear looking at any aerial photograph or figure ground. "More than one third of the surface of the average downtown city is paved. In Los Angeles two thirds of the surface is paved."[66] The extensive paving of thoroughfares and parking only makes people more automobile dependent, frequently against their wishes. "[People] are being made car dependant by the sprawling nature of development, and will have to work harder and longer to pay for the car they wouldn't

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[65] Ibid p.310

[66] Guiney, Anne. "Parking Structures", *Architecture* February 2001 p.65

need if urban development were made denser, more walkable and more transit friendly."[67] It seems as though parking and automobile dependency have become self-generating systems.

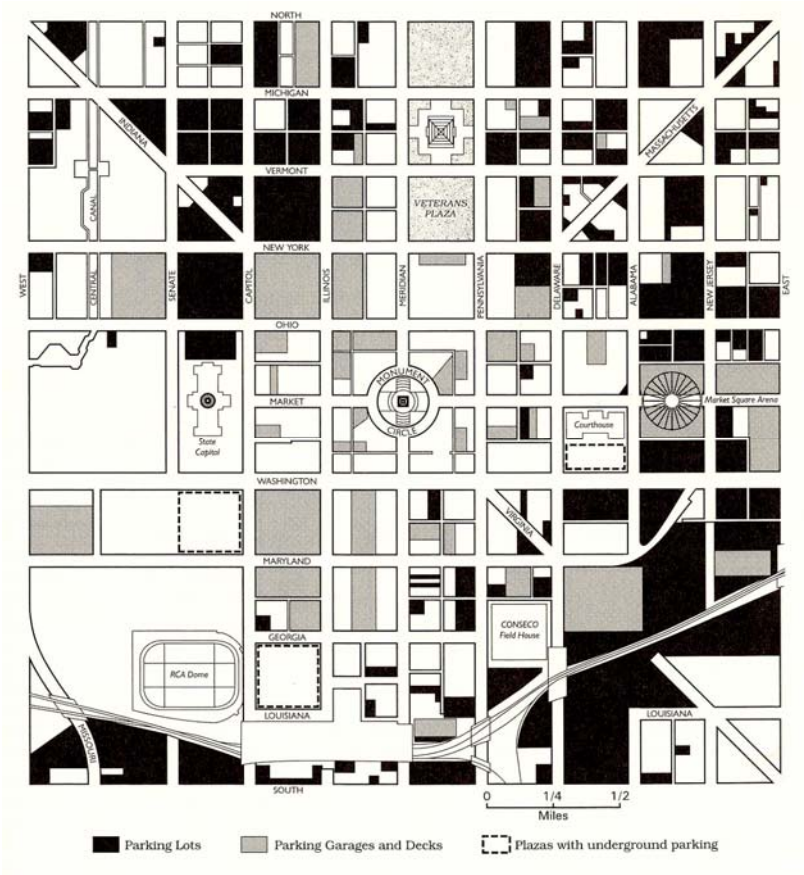

Figure 2.16
Parking areas in downtown Indianapolis, 2000. *Source:* Author's field survey, January 11 and February 5, 2000 as cited in *Lots of Parking* p.153

[67] Kressel, Shirley. "Suburbanization from Within: Are we retrofitting our cities for parking lots?", *Landscape Architecture*. June 2000 p.136

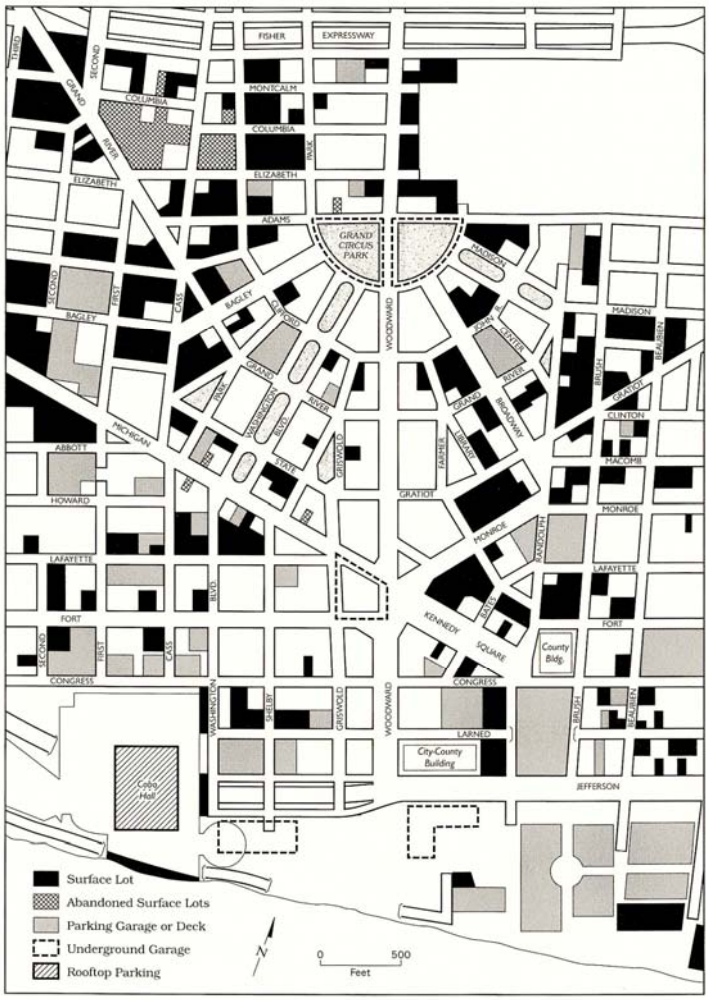

Figure 2.17
Area devoted to parking in downtown Detroit, 1999. *Source:* Windshield survey by authors 1999 as cited in *Lots of Parking* p.189

Given this condition, some cities have attempted to combat the rampant proliferation of asphalt. In 2002, Eugene Or, Cambridge MA and Gainseville FL altered their zoning to mandate parking maximums, rather than minimum standards, in an effort to control sprawl.[68] Other cities, most notably San Francisco, have introduced legislation to unbundle off-street parking from residential units, in addition to drastically

[68] Millard-Ball, Adam . "Putting on Their Parking Caps", *Planning*. April 2002 p.17

decreasing minimum requirements.[69] Another popular idea in current circulation is Mixed Transportation Developments (MXTs), which seek to create connections between the automobile, mass transit and the pedestrian. "Good" MXTs are governed by six guiding principles: create a center of activity, orient the center for maximum impact, use pedestrian circulation, include mixed uses, avoid dead zones and create linkage.[70] They are essentially transit-oriented developments expanded to include the automobile rather than dismiss or hide it, as is seen in traditional TOD's (transit-oriented development). This gives them plausibility and grounds them in the realm of actual possibility for present day America. Planners and developers are finally beginning to understand the impact of the automobile and control development more thoughtfully.

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[69] Ibid p.19

[70] Dawe, Patric . "Mixed-Use Transportation Projects: Catalysts for Urban Revitalization", *Urban Land*. October 2002 p.97

CONCLUSION

As the automobile became ingrained in American culture, parking lots grew to be necessary companions to all other land uses. Their size and prevalence made them the most spatially dominant element of the twentieth century city. Since their inception, parking lots were and continue to be viewed as strictly utilitarian; they have never been seen as anything more. Design debates have focused on issues of layout,[71] traffic engineering and beautification,[72] drawing upon the talents of civil engineers, traffic engineers, planners, developers, contractors, government officials and landscapers. They have not included architects, landscape architects, urban designers environmentalists or sociologists. The parking lot, despite its numerous cosmetic transformations, has never been designed beyond its utilitarian origins. It is only in the last ten to fifteen years that designers (architects, landscape architects, urban designers) have begun to see the design potential of the parking lot, and attempt to design it as a critical element of the city.[73]

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[71] This includes angled parking vs. perpendicular parking, two-way drive aisled vs. one-way drive aisles, stall patterning and circulation, among other issues.

[72] Issues of landscaping, concealment and materiality

[73] See Appendix A. Environmental Concerns and Strategies for Parking Lots and Appendix B. Parking Lot Competition Entries.

3. PARKING LOTS AND PUBLIC SPACE

Public space is simultaneously a built environment and a social setting. Analyzing the visual qualities of urban public space can improve our understanding of the relationship between spatial forms and social interaction.[74]

Architects, planners, urban designers and sociologists, among others, use the term *public space* interchangeably with public domain, public territory, public realm and public sphere. These words, though generally understood, are not explicitly defined, resulting in a muddy and confused interdisciplinary dialogue. Merriam Webster Unabridged Dictionary defines:

Private as: 1a: intended for or restricted to the use of a particular person or group or class of persons: not freely available to the public
1b: belonging to or concerning an individual person, company or interest
1c: restricted to the individual or arising independently of others
1d: affecting an individual or small group[75]

Public as: [1]1a: of, relating to or affecting the people as an organized community
1b: of or relating to the international community or to mankind in general: common: universal
3b: of, relating to, or in the service of the community or nation
3c: devoted to the general or national welfare
[2]1: a place accessible or visible to all members of the community
2a: an organized body of the people: community: nation
2b: the people as a whole: populace: masses

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[74] Thibaud, Jean-Paul . "Frames of Visibility in Public Places", *Places* Winter 2001. p. 42

[75] Webster's Third New International Dictionary of the English Language Unabridged. Merriam-Webster Inc., Publishers, Springfield MA, 1993. p. 1804-1805

3: a group of people distinguished by common interests or characteristics[76]

Domain as: 1: landed property which one has in his own right

2a: the possessions of a sovereign feudal lord, nation or commonwealth

2b: a territory possessed and governed of right over which authority is exercised of right

2c: field of control or range of governance

2d: a region distinctively marked or wholly overspread or dominated by some physical feature[77]

Space as 2a: a limited extension on one, two, or three dimensions: distance, area, volume

2b: an extent or area set apart or available for a particular purpose

2c: an unobstructed area[78]

Realm as 1: kingdom

2: region, territory

3: sphere, domain, range[79]

This last term has come to mean so many things, that it no longer intrinsically means anything. Instead, I offer Lofland's definition: "Realms are not geographically or physically rooted pieces of space. They are social, not physical territories."[80] When used in combination, these words yield the following concepts:

Private Domain – Property legally owned by a person or group which is not freely available to the public.

Private Space – An extent or area whose use and accessibility are confined to a particular person or group

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[76] Webster 1836

[77] Webster 670

[78] Webster 2180

[79] Webster 1890

[80] Lofland, Lyn. The Public Realm: Exploring the City's Quintessential Social Territory. Aldine de Gruyter, New York. 1998 p. 11

Private Realm – A social territory comprised of people of the same group characterized by intimate person-to-person relationships.

Public Domain – Property legally owned by the community or nation.

Public Space – An extent or area generally accessible to members of the community or nation.

Public Realm – A social territory comprised of strangers characterized by fleeting and routinized interpersonal relationships.

As this thesis is concerned with parking lots as public space and public realm, it will focus primarily on the last two concepts.

The "public" is not a single and homogenous entity; there are many publics in any city. A space does not need to be accessible to all publics at all times to be public space. The only public space which is universally accessible is the street. The right of way is public domain, public space and, when inhabited by strangers interacting, public realm. All other public spaces are public by degrees. They deny accessibility at certain times or to certain publics, and often they do both. This is not necessarily negative.

> By eliminating the insistence on unity, the desires for fixed categories of time and space, and the rigid concepts of public and private that underlies these narratives of loss, we can begin to recognize a multiplicity of simultaneous public interactions that are restructuring urban space, producing new forms of insurgent citizenship, and revealing mew political arenas for democratic action…This, instead of a single "public" occupying an exemplary public space, the multiple and counterpublics that Fraser identifies necessarily produce multiple sites of public expression, creating and using spaces that are partial and selective, responsive to limited segments of the population and to a limited number of the public roles individuals play in urban society.[81]

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[81] Crawford, Margaret. "Contesting the Public Realm: Struggles over Public Space in Los Angeles", *Journal of Architectural Education*, September 1995. p.4-5

If, however, all of the public spaces of a city are intended for the same public(s), the result will be boring, homogenous and exclusive, the polar opposite of the richness and diversity which public space should aim to create.

> [public space has] a very functional role, an obvious one, which is to provide unique public places that enhance the convenience, the enjoyment, and the social experiences of the residents, employees and visitors to the city. We also have, I think, an aspirational, majestic goal that was articulated so famously, of course, by Olmstead for Central Park, which was to bring together rich and poor, young and old, and all ethnic and religious groups into a shared experience in which, by seeing the other and enjoying things together, there would be a democratization of society.[82]

Unfortunately, these goals are rarely realized. As people lead increasingly private lives, often their acceptance of "otherness", particularly when it is embodied by indigents and criminals, declines, along with their use of most public spaces. "For these people, the definition of a 'public' place has become a space without homeless people. Homelessness is perhaps the ultimate determination of citizenship. Defined as undesirables, the homeless are not just evicted from public parks, they are stripped of 'the right to have rights'."[83] The homeless public, above all others, is most frequently denied access to newer, sanitized public spaces, which has considerable implications for older, traditional, non-sanitized spaces. As they become overrun by the "unwashed", who have been forcibly removed from all other "public spaces", these places are branded as unsafe and unusable by "respectable members of society", and the gap between the multiple publics increases until there is little or no contact between them.

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[82] Thomas Kayden as quoted in Thompson, William, "In Search of Public Space", *Landscape Architecture*, August 2001. p. 72

[83] Crawford, Margaret, "Contesting the Public Realm: Struggles over Public Space in Los Angeles", *Journal of Architectural Engineering*, September 1995. p.8

"Ill maintained, unsafe, public streets have become the final refuge of the homeless, bared from public libraries, park benches, train stations and shopping centers. To look at our streets is, disturbingly, to see our failure to maintain a viable public life."[84]

The result is an enclave lifestyle where people reside in gated communities, move through the city in private automobiles and work in carefully controlled office parks or shopping malls. Predicated on the separation of uses and segregation of publics, this way of life arose after World War II as a result of several coinciding conditions:

> 1. Automobile manufacturers (and their suppliers), who were once again producing domestic products and who tried to ensure the sale of those products by luring in customers with advertising and cheap prices.
> 2. A United States government that decided – for defense, as well as for economic reasons – to build an interstate highway system.
> 3. Developers and contractors who had learned techniques of mass-housing construction during the war and were poised to try them out on all that not-that-far-from-the-city open land made or about to be made "commutable" by the highways and all the newly purchased cars.
> 4. Government and private plans for home mortgages that targeted their loans toward newly built homes only.
> 5. Tax policies that favored home owners over renters.
> 6. A large scale "urban renewal" effort that wiped out a substantial portion of the prewar urban housing stock.
> 7. Decisions by municipality after municipality to modernize themselves by tearing up their light rail lines, shutting down their bus systems and turning their streets over to the private automobile.
> 8. An ideology among urban planners that "privileged" an environment of grass and trees over one of streets and buildings.

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[84] "Public Space and Public Life", *Modulus* 1991. p. 84

> 9. A strong theme of anti-urbanism in the cultural baggage carried by both the builders and the buyers.[85]

In this new lifestyle, many Americans rarely ventured beyond the sanitized private locales of work, shopping mall or theme park, and almost all Americans traveled by private automobile. Their only exposure to true public space was in the transition from private automobile to private destination: the parking lot. The surface parking lot has always been public space; it is open and accessible to the public. However, it was not until a majority of Americans began traveling by private car and using the parking lot on a regular basis that it became the primary setting for public life.

A city is comprised of two orders; the constitutional, which is the physical framework of streets, lots and blocks, and the representational, the activities which take place inside the framework. The coupling of constitutional and representational , structure and activity, can be found in every element of the city, including the parking lot. The constitutional order of the parking lot; layout, circulation paths, landscaping, boundary conditions, building adjacencies, etc..., is a framework for the efficient storage and conveyance of automobiles. This is the singular task for which they have been engineered.[86] However, the representational order of the parking lot can move far beyond the utilitarian aims of those who built it.

> In Baldwin Hills, a middle class African-American neighborhood, a parking lot between a gas station and a supermarket has become a scene of intense, if fluctuating, social and commercial activity. On most days, a van parks in the lot, offering car detailing services. The operators, two local men who are now retired, set out chairs, providing a social magnet for neighborhood men who pass by. On weekends, a portable

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[85] Lofland p. 196-198

[86] As stated in the conclusion to the previous chapter, parking lots have never been designed as their execution has rarely involved designers. Instead, they have been engineered, primarily by traffic engineers, civil engineers and developers.

> barbeque is set up nearby, selling "home-cooked" ribs and links. On holidays and weekends, a group of middle-aged women joins them. Setting up tables to sell homemade crafts and gifts. Mostly grandmothers who work at home, their products represent both hobbies and an income supplement. Replicating the domestic order of the surrounding neighborhoods and expanding the private roles of grandparents into the public realm; their local activities provide a focus for the community that is also accessible to anyone driving by. Simultaneously local and public, the activities in the parking lot strengthen the neighborhood while they visibly represent its culture to outsiders.[87]

These publics have altered the representational order of the parking lot from automobile storage to varied public realm, despite the lot's limited constitutional framework; this is not a unique phenomenon. Parking lots, because of their prevalence and indispensability, are ideal public spaces for the representational changes which foster the public realm.

This thesis proposes two strategies to improve the public space of the parking lot and create public realms. First, design the constitutional framework to support activities including, but not limited to, the storage and conveyance of automobiles. Second, augment the representational order through transient supplementary program. If both the constitutional and representational orders of the parking lot are changed, it is certain that the perception and role of parking lots as utilitarian voids in the urban fabric will change as well.

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[87] Crawford, Margaret, "Contesting the Public Realm: Struggles over Public Space in Los Angeles", *Journal of Architectural Engineering*, September 1995. p.7

4. PARKING ANALYSIS

Not all parking lots are the same; different types of parking lots require distinct interventions in constitutional and representational orders to augment their position as public space. Parking lots can vary in their adjacency, boundary, property value and relationship to context. When these conditions are mapped onto one another, an understanding of primary spatial type and secondary attribute type emerges. The following diagrams are an analysis of surface parking lot typologies on Peachtree Street between 10th Street to the North and Ponce De Leon to the South, and Ponce de Leon between Peachtree Street to the West and North Highland Avenue to the East. This analysis area was chosen for several reasons:

1. Peachtree Street and Ponce de Leon are both major streets in Midtown Atlanta, and support a variety of uses which create a wide range of parking conditions.
2. The mix of uses on both streets also appeals to multiple publics.
3. Both streets maintain regular Marta bus service, which adds a layer of programmatic diversity as well as population diversity.

Given this combination of mixed land uses, multiple publics and public transportation, this area has the potential to become great public space.

Figure 4.1 catalogues the attribute of land values per square foot for properties with surface parking lots. It reveals the relative worth of any given property within the context of the study area. The cost of design intervention, constitutional or representational, should be commensurate with the inherent value of the parking lot. This is not to say that low-value lots merit less attention than more expensive ones. Each value group warrants its own appropriate strategy.

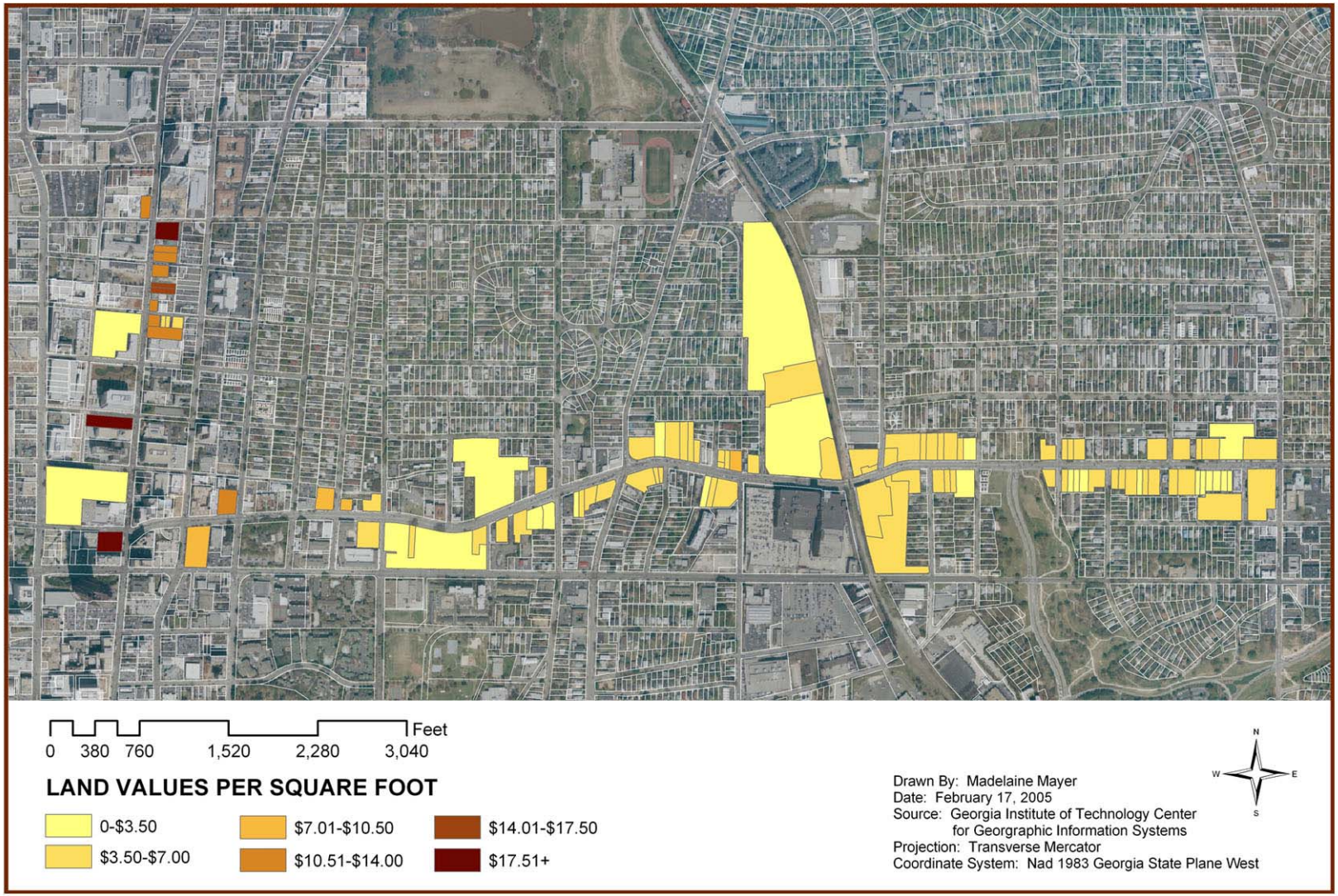


Figure 4.1

Land values per square foot of lots with surface parking on Ponce de Leon and Peachtree corridors

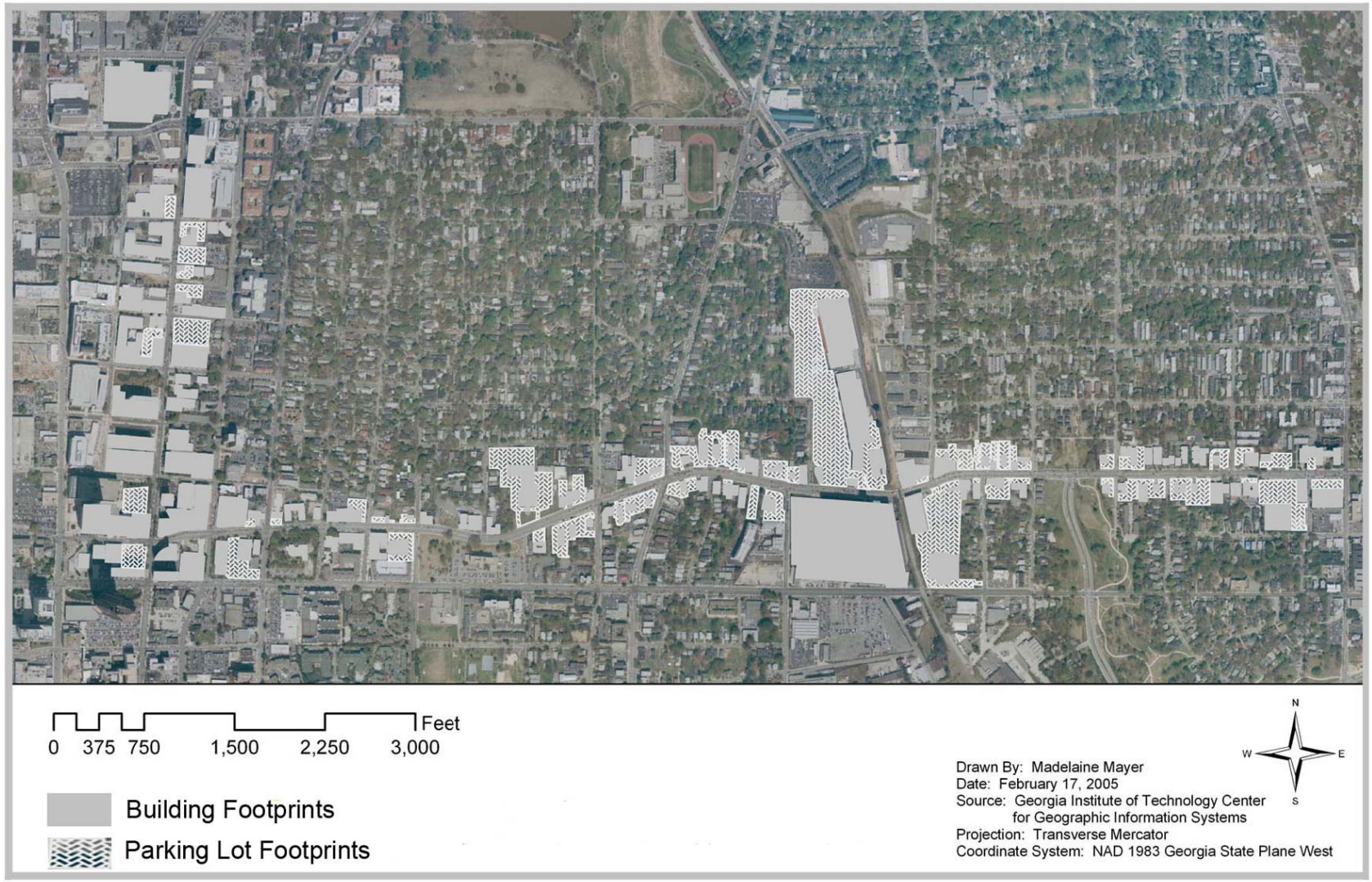


Figure 4.2

Figure-ground of Ponce de Leon and Peachtree Corridors highlighting Building and Surface Parking Lot Footprints

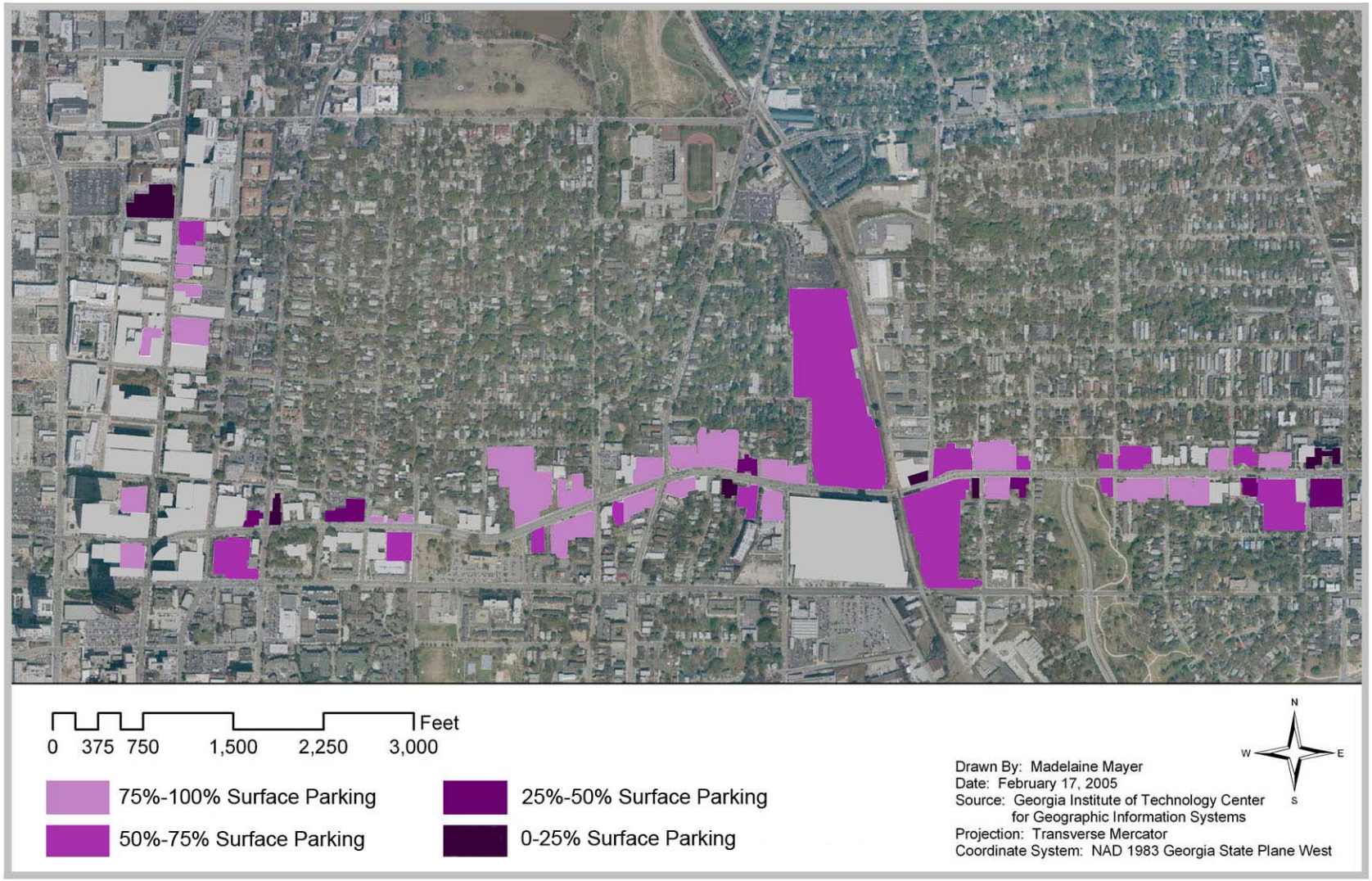


Figure 4.3

Ratio of surface parking to building footprints on Ponce de Leon and Peachtree Corridors

Figures 4.2 and 4.3 illustrate the attribute of figure ground relationships between parking lots and the buildings they serve. The percentage of the lot dedicated to parking is a measure of the visual and physical impact of surface parking. Different levels of coverage mandate different approaches to constitutional and representational changes.

		ASSOCIATIONS	
		YARD	ISLAND
BOUNDARIES	CORRAL	CORRAL-YARD	CORRAL-ISLAND
	VERGE	VERGE-YARD	VERGE-ISLAND

Figure 4.4
Typological Matrix illustrating the relationships between the four primary types of parking.

Spatially, a parking lot can be described by two features, boundary and association. The boundary condition can either be well-defined, a corral, or ambiguous, a verge. A parking lot can either be associated with a particular building(s), a yard, or stand as an autonomous unit, an island. When these attributes are juxtaposed, as in Figure 4.4, they yield four primary types of parking lots:

Corral-yard parking lots have definitive boundary conditions and serve a variety of building types: shopping centers, movie theaters, schools, airports and churches. They are the single most prevalent lot type and range in size from small to very large.

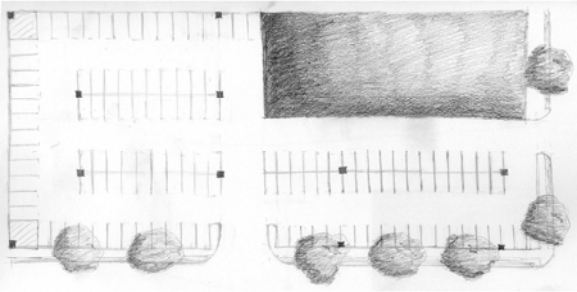


Figure 4.5
Photograph and Plan Diagram of typical Corral-Yard conditions**.**

Corral-yard lots have different periods of peak use depending on their adjacent program.

	SHOPPING CENTER	**SCHOOL**	**MOVIE THEATER**	**CHURCH**
PEAK HOURS	11AM-1PM 5PM-7PM	8AM AND 3PM	10PM	6PM-9PM
PEAK DAYS	SATURDAY SUNDAY	MONDAY-FRIDAY	FRIDAY-SUNDAY	SUNDAY
PEAK SEASON		SEPTEMBER-JUNE	MAY-AUGUST NOVEMBER-DECEMBER	CHRISTMAS EASTER

Figure 4.6
Matrix illustrating relationships adjacent program types against peak times

Corral-islands are autonomous parking lots which serve a general area. Their uses are the surrounding uses, as are their peak periods. They have a clear boundary and high controlled areas of egress. Often there is a fee to park, and like the corral-yard, they lots vary from small to very large.

Figure 4.7
Photograph and Plan Diagram of typical Corral-Island conditions.

Verge-yard parking lots are extensions of the street which provide a nominal amount of parking for a specific building(s). As parking is limited, adjacent program often capitalizes on short-term interactions to maximize parking turnover. Peaks vary with program, but as these lots are primarily associated with commercial functions, it is likely that peak hours are from 11AM to 1PM and 5PM to 7PM on weekdays and afternoons on weekends.

Figure 4.8
Photograph and Plan Diagram of typical Verge-Yard conditions.

Verge-island lots have neither building nor boundary, and are essentially small off-street collections of on street parking. Like the corral-island, their peaks and programs are those of the surrounding area, and there is a fee to park.

Figure 4.9
Photograph and Plan Diagram of typical Verge-Island conditions.

Figure 4.10 illustrates the distribution of these four types of parking along the study area. The clear separation of types between Peachtree Street, predominantly islands, and Ponce de Leon, primarily yards, articulates the different development patterns along these two streets and underscores the need for different typologically specific design strategies.

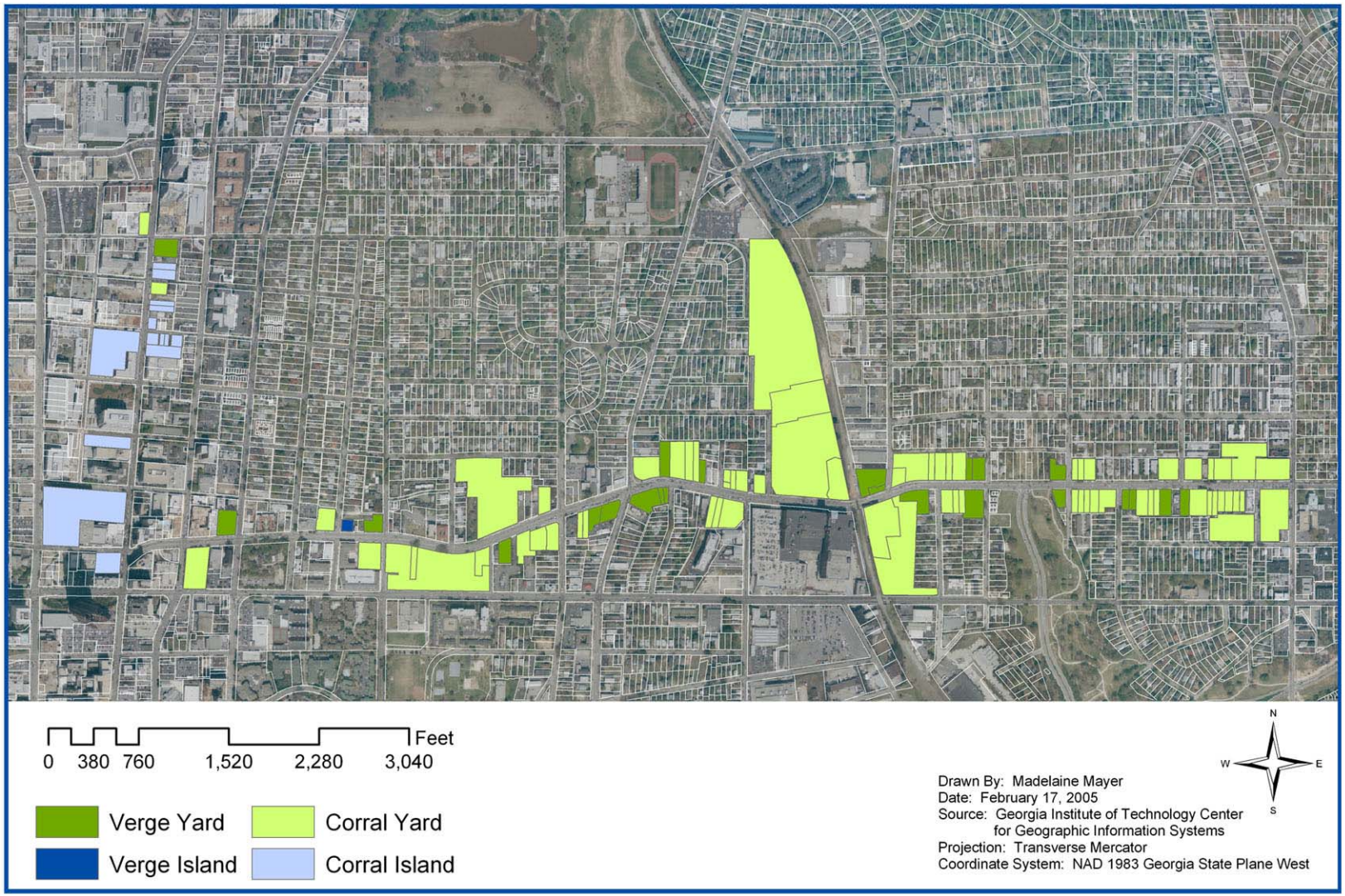


Figure 4.10

Spatial distribution of surface parking lots on Ponce de Leon and Peachtree Street corrifors

DESIGN STRATEGIES

CONSTITUTIONAL ORDER

A **corral-yard** parking lot should emphasize the presence of the boundary around the lot and the dissolution of the boundary at the points of egress. When possible, primary circulation should be separated from parking and flank the adjacent building(s). Large lots should be subdivided into smaller ones, in much the same way that superblocks should be separated into city blocks. This will create human-scale environments while establishing a framework for future growth.

A **corral-island** should focus primarily on circulation. Entrance and exit points should be intuitively understood, as should the paths of motorists and pedestrians. If possible, the lot should be divided into discreet sections creating a pattern for future development.

A **verge-yard** parking lot is defined by its ambiguous relationship to the street. The vagueness of the verge condition should be maintained and emphasized, through the use of material, topography and texture.

A **verge-island** is characterized by a veritable absence of constitutional order. There are few hard boundaries or distinctions between parking, circulation and right of way. Its ambiguity should be preserved through material and topography.

REPRESENTATIONAL ORDER

The representational order of a parking lot is characterized by two features: program type and temporal duration. There are three primary types of secondary program suited to parking lots: mercantile, service and recreation, and four temporal possibilities: occasional, periodic, seasonal and continuous. Their juxtaposition yields twelve representational categories.

	OCCASSIONAL	**PERIODIC**	**SEASONAL**	**CONTINUOUS**
MERCANTILE	UMBRELLA SALESMAN IN THE RAIN	SATURDAY ART MARKET	CHRISTMAS TREE SALES	EARLY MORNING BREAKFAST CART
SERVICE	COMMUNITY PETITION SIGNING	SCHOOL FUNDRAISER	VOTER REGISTRATION	RECYCLING CENTER
RECREATION	FOUR-SQUARES	WEEKEND STREET HOCKEY	TEMPORARY SKATE PARKS	BASKETBALL COURT

Figure 4.11
Matrix juxtaposing program types against durations, illustrating examples of each of the twelve representational categories

Each of these are appropriate to specific spatial types.

	OCCASSIONAL	**PERIODIC**	**SEASONAL**	**CONTINUOUS**
MERCANTILE	CORRAL-YARD CORRAL-ISLAND VERGE-YARD VERGE-ISLAND	CORRAL-YARD CORRAL-ISLAND VERGE-YARD VERGE-ISLAND	CORRAL-YARD CORRAL-ISLAND VERGE-YARD VERGE-ISLAND	CORRAL-YARD CORRAL-ISLAND
SERVICE	CORRAL-YARD VERGE-YARD	CORRAL-YARD VERGE-YARD	CORRAL-YARD VERGE-YARD	CORRAL-YARD
RECREATION	CORRAL-YARD	CORRAL-YARD	CORRAL-YARD	CORRAL-YARD

Figure 4.12
Typological Matrix illustrating the relationships between the four primary spatial types and twelve representational categories of program type and duration.

A **corral-yard** lot can support any type of secondary program. As there is no parking fee, there is no pressure to quickly leave the lot, a necessary prerequisite for service or recreational uses. The stability afforded by its boundary allows for more permanent, continuous program as well as occasional, periodic and seasonal interventions. The corral-yard is also an appropriate setting for a wide range of mercantile programs.

A **corral-island** lot is more limited. The parking fee creates a pressure to leave the lot as quickly as possible. Therefore service and recreation programs, which demand a significant amount of time, are inappropriate. However, the lot can support a full range of mercantile activities.

A **verge-yard** operates in a similar fashion as the corral-yard, although it is limited by its size. It is too small to support substantial recreation, nor can it support continuous programmatic intervention, as it cannot spare many spaces. However, it is well suited to both service and mercantile uses of an occasional, periodic or seasonal nature.

A **verge-island** maintains the same relationship to the verge-yard as the corral-island does to the corral-yard. It will only support mercantile functions of the same duration as its yard-counterpart. Additionally, as the verge-island is so small, programs here must be small and movable. It is ideally suited to the pushcart.

CONCLUSION

All parking lots are not the same. They differ in physical characteristics, land value, coverage, boundaries, associations and size, as well as aspects of use, programs and peak periods. These variations construct types that mandate particular approaches, in both the constitutional order and representational order, to enrich public space. On any given site, the combination of typologically specific strategies for each attribute will invariably result in a unique and comprehensive design strategy. Just as parking lots vary by type, so must strategies to improve them.

5. PARKING LOT DESIGN:

MIDTOWN PLACE AND MIDTOWN PROMENADE

All streets are public space, although not all streets support the public realm. A democratic street, one which fosters the public realm, is comprised of several key elements: mixed uses, multiple publics, appropriate scale and public transportation, to name a few. Like streets, not all parking lots can or should endeavor to further the public realm. Those which support intimate programs, such as residences or medical facilities, should strive to maintain the privacy desired by their patrons. In contrast, parking lots featuring more open programs, grocery stores or bowling alleys, are ideal settings for social transformations, as they possess the same components as the democratic street.

Within the study area, one parking lot in particular has the greatest potential for social transformation: Midtown Place on Ponce de Leon Avenue.

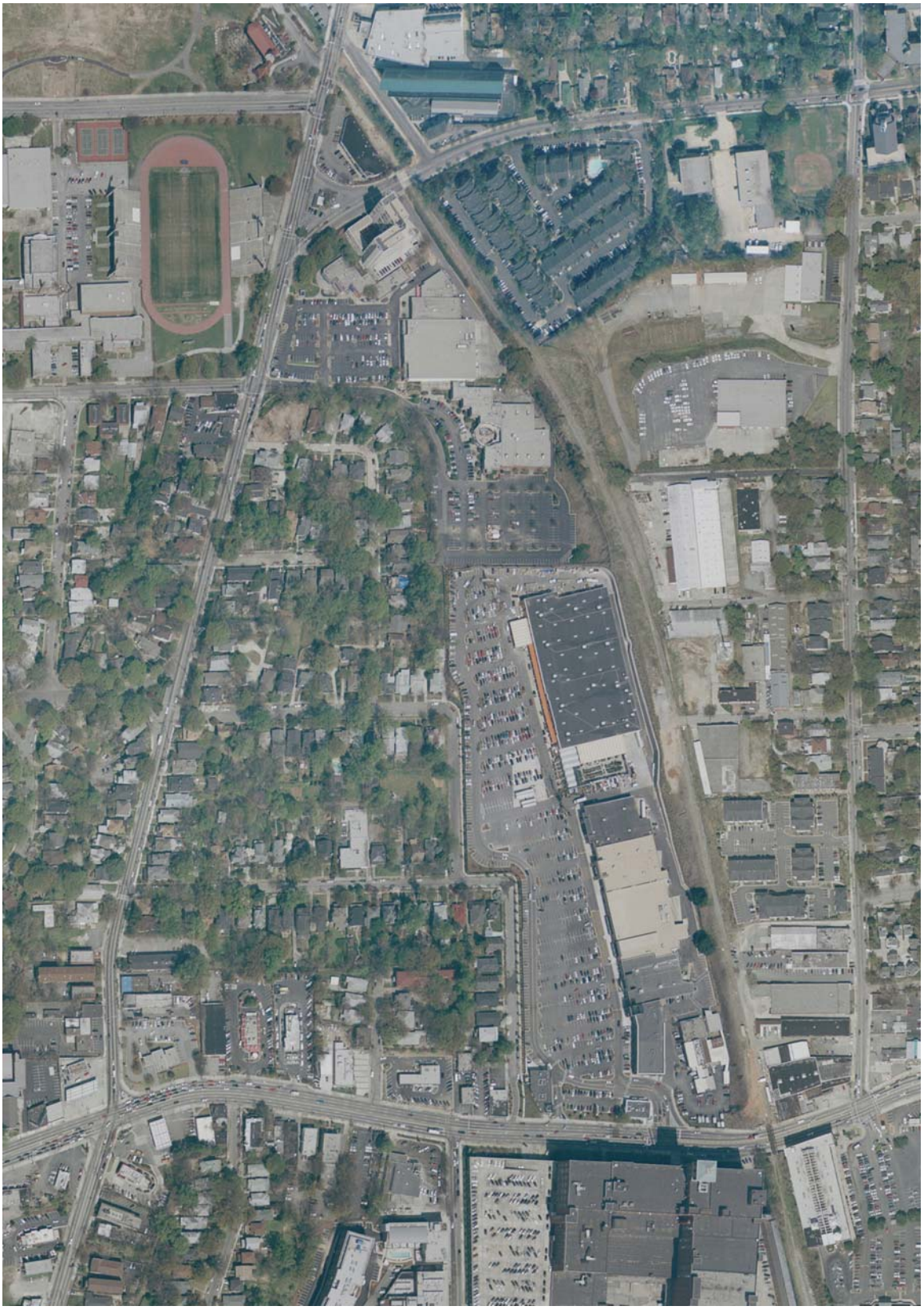


Figure 5.1
Aerial Photograph of Midtown Place and Midtown Promenade. *Source:* www.seamless.usgs.gov

This area has a long history as a setting for the public realm. In the 1880s it was the site of Ponce Springs Amusement Park and what many believed to be the fountain of youth.

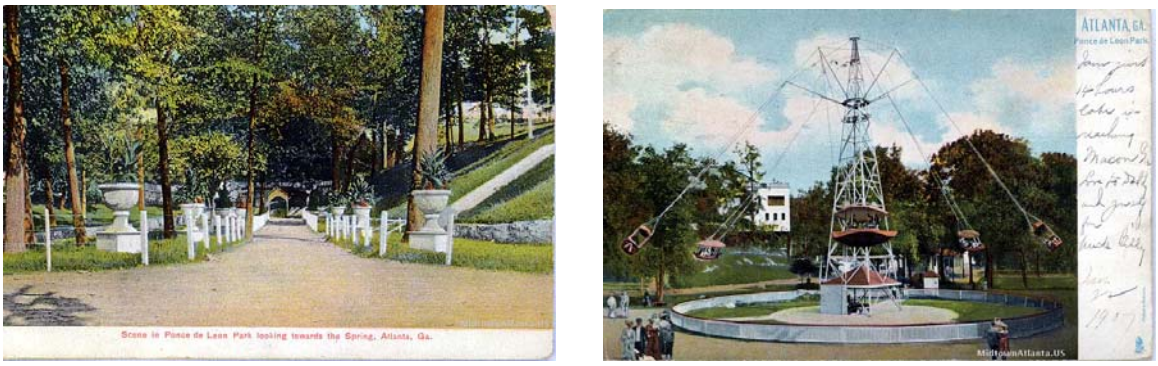
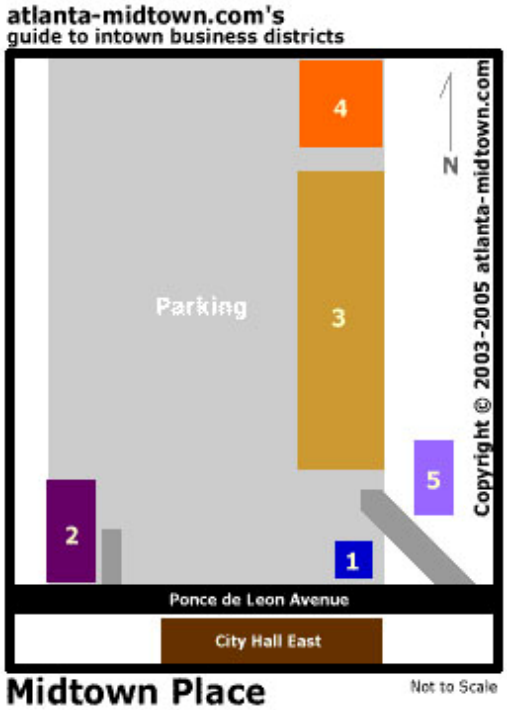


Figure 5.2
Postcards of Ponce Springs Amusement Park. *Source*: www.midtownatlanta.us

In 1907 the site was transformed into Ponce de Leon Ballpark, also known as Spiller Field, home to the Atlanta Crackers until 1965.

Figure 5.3
Postcards of Ponce de Leon Ballpark. *Source*: www.midtownatlanta.us

It currently supports a variety of commercial uses: a hardware store, pet store, restaurants, supermarket, book store, catering service, office supply store and several small businesses, while flanking a residential neighborhood.



Business Directory:

1. Baskin Robbins
   Dunkin Donuts
2. Qdoba's
   The Mattress Firm
   Youngblood's
3. Olive Bistro
   Planet Beach Tanning
   Midtown Cleaners
   Smoothie King
   GNC Nutritional Bar
   Pearl Optic
   Eclectic Furniture
   Midtown Dental Center
   Carlson Wagonlit Travel
   Midtown Place Chiropractic
   Army Recruiting Station
   Nail Salon
   Prudential Atlanta Realty
   Borders Books and Music
   Seattle's Best Coffee
   Whole Foods
   Staples
   PetSmart
4. Home Depot
5. An Affair to Remember

Figure 5.4
Business Directory of Midtown Place. *Source*: www.altanta-midtown.com/business/midtownplace

It is a popular destination on the Marta #2 Bus Line, and is bounded on its eastern edge by the future site of the Belt Line. Once the Belt Line is established, the site will undoubtedly become an even more popular destination.

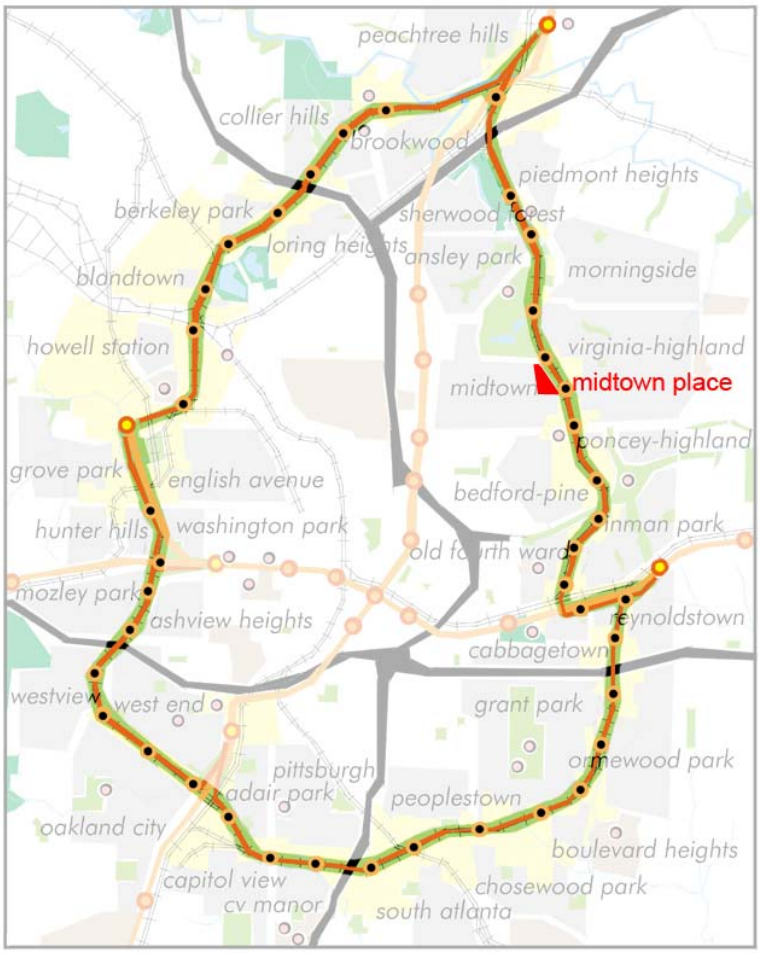


Figure 5.5

Belt Line Loop. *Source:* www.beltline.org

Midtown Place is also directly adjacent to a similar development, Midtown Promenade, on its northern edge. Currently, these two shopping centers are separated by a retaining wall which maintains a fifteen foot grade change.

atlanta-midtown.com's guide to intown business districts

Monroe Drive @ Virginia Avenue

Business Directory:

9. Wachovia ATM

10. Nam
    Mailboxes, Etc.
    Mellow Mushroom
    Jersey Mike's Subs
    Lexington Chocolatier
    Frogs Cantina
    Hunan Express
    ECC Cleaners

11. HoeDowns
    Tuesday Morning
    Save-Rite

12. The Highlander
    Apres Diem
    Landmark Midtown Cinemas
    Royal Orchid
    Nail World
    H.M. Bush, D.D.S
    Dupree's
    Eagle Claw Kung Fu Center
    Studio Bizarre
    Stillwater Yoga

Figure 5.6
Business Directory of Midtown Promenade. *Source*: www.altanta-midtown.com/business

Figure 5.7
Retaining wall dividing Midtown Place and Midtown Promenade.

Figure 5.8
Pedestrian path at the retaining wall gap between Midtown Place and Midtown Promenade.

The steep slope at the wall's edge is carved with pedestrian paths. Although pedestrians travel between the two shopping centers is possible, it is difficult, and there is no vehicular connection. If these two properties were connected they would form a swath against the Belt Line track linking Ponce de Leon Avenue and Monroe Drive,.

> The Ponce de Leon Avenue study area exhibits most of the characteristics of an urban, interconnected street system…This said, there are two major disconnects in the network. The first is the Belt Line, over which the lack of access forces east/west traffic onto Ponce de Leon or North Avenues and compromises their operations. The second break is closely related to the first and involved Midtown Place and Midtown Promenade shopping centers. Drivers, pedestrians and bicyclists who want to travel from one to the other are forced to go almost one mile out of their way.[88]

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[88] Tunnell, Spangler, Walsh and Associates. *Ponce de Leon and Moreland Avenue Corridors Study*. February 4, 2005 p. 1:6

The Ponce de Leon Corridor Study further states:

> Within the next 20 years it is likely that both shopping centers will be obsolete and redeveloped into more urban, mixed-use pedestrian-oriented extensions of the Midtown neighborhood. When this occurs, plans should include a street running from Ponce de Leon Avenue to Monroe Drive.
> Because they are not likely to redevelop at the same time, the first redevelopment should build said street to the adjacent property line, while the later project could tie in at said location at a future point in time.[89]

Additionally, the analysis recommends "…pedestrian, bicycle or vehicular access…from Midtown Promenade to Midtown Place by running a narrow street along the western edge of the site."[90]

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[89] Tunnell, Spangler, Walsh and Associates. *Ponce de Leon and Moreland Avenue Corridors Study*. February 4, 2005 p. 3:2

[90] Tunnell, Spangler, Walsh and Associates. *Ponce de Leon and Moreland Avenue Corridors Study*. February 4, 2005 p. 1:7

Figure 5.9
Potential long term street location, with redevelopment. *Source*: Tunnell, Spangler, Walsh and Associates. *Ponce de Leon and Moreland Avenue Corridors Study*. February 4, 2005 p. 3:2

Although this strategy remedies the immediate problem of the disconnect between the two shopping centers, its scope is limited. The “narrow street” is designed to fit into the existing condition of poor circulation and haphazard development; the same development which the authors of the study state will be completely changed within the next twenty years.[91]

Rather than design for a mediocre and temporary condition, this thesis argues in favor of a comprehensive constitutional order of streets, blocks and lots to create a framework for future redevelopment and expansion while serving the present needs of parking and circulation. Currently the site, Midtown Place and Midtown Promenade, suffers from the following weaknesses:

1. There is no connection between the two shopping centers.
2. There is no clarity of pedestrian or vehicular circulation.
3. Development is haphazard; there is no overarching site strategy.
4. There is no connection to the Belt Line.
5. There is not enough parking to support current uses.

This thesis proposes the following strategies to address these weaknesses, provide a framework for future expansion and foster the public realm:

1. Create a street connecting Ponce de Leon Avenue and Monroe Drive.
2. Subdivide the property into streets, blocks and lots.
3. Design places for the pedestrian interaction which fosters the public realm.
4. Design a more pleasant and habitable environment using landscaping, lighting, street furniture and shading.

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[91] Tunnell, Spangler, Walsh and Associates. *Ponce de Leon and Moreland Avenue Corridors Study*. February 4, 2005 p. 3:2

Main Street

Currently Midtown Place and Midtown Promenade are two adjacent, yet estranged properties, inaccessible to one another. The absence of a connection is irritating to customers wishing to use both shopping centers, and compounds traffic problems on Ponce de Leon Avenue and Monroe Drive.

Figure 5.10
Current routes of circulation in Midtown Place and Midtown Promenade shopping centers.

Figure 5.11
View of current circulation path

Although it is widely agreed that the sites must be connected, the nature of this connection is highly debated. Some planners advocate a ramp between the two parking lots, while others propose a narrow road on the western edge. These strategies are both passive and inadequate. Instead, this thesis proposes a main street, with parallel parking, sidewalks and street trees, running through the center of the site and connecting to 8th Street at Monroe Drive.

Figure 5.12
New main street connecting Midtown Place and Midtown Promenade shopping centers.

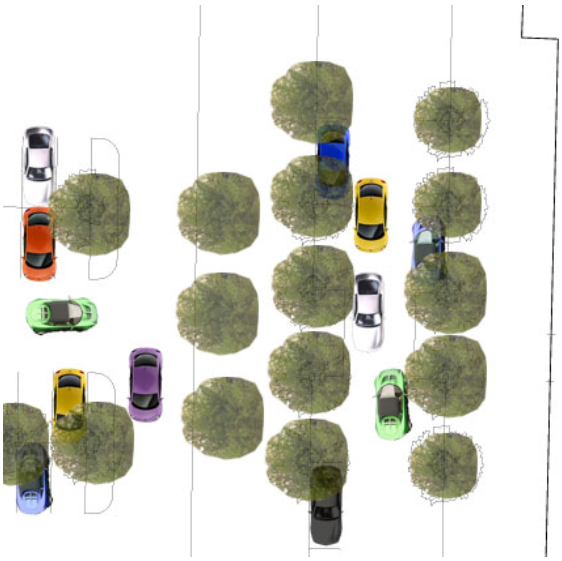

Figure 5.13
Plan view of main street.

Figure 5.14
Typical Section of main street.

Figure 5.15
View of the main street connecting Midtown Place and Midtown Promenade.

This street will serve to connect Ponce de Leon and Monroe while creating a spine joining and activating the two distinct sides of the site.

Streets, Blocks and Lots

The existing condition of Midtown Place is one super lot. There are no parameters guiding future development, nor is there any effort to create smaller, more human scale spaces. Given the site's urban context, the site should be subdivided into secondary streets, blocks and lots, which would create a framework for future development as well as a more comprehensible parking lot.

Figure 5.16
Subdivision of the site into street, block and lot framework.

Additionally, this framework would allow for partial site development without disrupting circulation patterns or parking conditions.

Pedestrian Places

Although the public realm is a social territory, it requires a physical location. In a large parking lot, like Midtown Place, space should be dedicated as a setting for the public realm. These spaces should be in locations of maximum visibility and, although they are in a parking lot, these spaces should be pedestrian oriented.

Figure 5.17
Areas reserved for supplementary program and pedestrian activities

Given their size and location, the sidewalks of the main street running through the site are ideal locations for the supplementary program (representational order) which fosters the public realm.

Pleasant Outdoor Environment

The public realm depends upon people stopping to interact, and no one will stop in a place which is unpleasant. As parking lots are generally considered to be ugly and inhospitable, they must be fundamentally redesigned to engender the positive response to site which bolsters the public realm. At Midtown Place, the primary issues of environment are hot western light and an abrupt boundary condition, in addition to the hundreds of parked cars. This thesis therefore proposes an ample supply of trees for shading and overall aesthetics, and concealment of the boundary, through landscaping and artwork. Additionally, green roofs, pergolas and shading devices on the buildings will also reduce the heat island effect and improve the overall quality of the parking lot.

Figure 5.18
Distribution of tree types used to create specific block character.

CONCLUSION

In the contemporary American city, the street and specifically the sidewalk, is seldom the setting for the public realm. As more Americans began to travel by automobile, rather than by foot, the locus of public life shifted from the sidewalk to the parking lot. The surface parking lot represents the transition between two private realms, the automobile and the destination, and for the past century, since its inception, the parking lot has been viewed as a necessary evil to support the convenience of modern mobility.

Traditionally, in the United States, parking lots are expected to be utilitarian, prevalent and free. Even as public space disappeared, there was little demand for new public spaces, particularly not in the parking lot. However, the parking lot has tremendous potential to reinvigorate the steadily deteriorating public realm. The design proposal for the transformation of Midtown Place and Midtown Promenade illustrates how fundamental changes that do not compromise a parking lot's utility can change its nature. A parking lot does not need to simply be a repository for parked cars. It can rise to social prominence and relevance like streets, parks or plazas when designed with the same intent and attention. The parking lot did not destroy the traditional city; downtowns were eaten away by vacuous, undesigned, utilitarian wastelands which, coincidentally, were used to store unused automobiles.

Given the understanding that it is the combination of singular program and undesigned form which fragmented the urban fabric, it is incumbent on designers to reevaluate the role of the surface parking lot in the American city, and value it commensurately. Good or bad, parking lots are the primary settings for public life for most Americans, and should be designed to foster the richest and most vital public realms possible.

A. ENVIRONMENTAL CONCERNS AND STRATEGIES FOR PARKING LOTS

We don't want to screen things. We want to see *things. A lot of ecological problems come from hiding the way things really work.*[92]

One of the great consequences of development is its impact on the natural environment. The substitution of virgin land, be it grassed, wet or wooded, for "civilization" has severe ecological ramifications, from air and water pollution to climate changes to radical shifts in ecosystem compositions. Paved surfaces introduce a host of new issues, perhaps the most severe of which is stormwater runoff.

Rampant stormwater runoff is a phenomenon unique to developed land. "In natural wooded conditions, 10% of stormwater runs off, 25% becomes groundwater through deep infiltration, and 25% goes to shallow infiltration to reemerge eventually as the base flow for streams."[93] The remaining 40% evaporates. However, in developed environments, where surfaces are paved and 75%-100% impermeable, 55% or more of all stormwater runs off[94]. It is both the quantity and the quality of this water that are of grave concern. According to the Environmental Protection Agency (EPA), 70% of water pollutions emanates from non-point sources; agricultural byproducts, lawn chemicals,

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[92] Thompson, William, "The Poetics of Stormwater", *Landscape Architecture*, January 1999. p.86

[93] Duffy, Stephen "Smart Pond for Stormwater Management", *Urban Land*, December 1992. p.43

[94] Duffy, Stephen "Smart Pond for Stormwater Management", *Urban Land*, December 1992. p.43

automotive oils, heavy metals, pesticides and airborne particulates.[95] These water pollutants are primarily transported through stormwater runoff. In fact, the extent of water pollution has become so devastating that in 1992, the EPA declared that "more than one third of the nation's rivers and nearly half of its lakes are unfit for drinking, swimming, or fishing."[96]

In addition to designing circumstances which create an abundance of stormwater runoff and compromise the water's quality, we have also devised one of the most environmentally insensitive methods for its management.[97] Though development patterns have changed radically over the past century, stormwater drainage systems have not.[98] We still rely on an antiquated system of sewers and detention basins, which frequently clog and occasionally cause more problems than they solve. "Randomly sited detention ponds cause concentrated discharge and increases in flood peaks at the junction of tributary streams…[in fact] in Atlanta there are over 10,000 basins now [1991]; there are places where, it is said, you can step from one basin into the next."[99] These systems function poorly in their mechanics, but also create further environmental problems. By removing excess water through sewers, groundwater is prevented from

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[95] Ferguson, Bruce K. "The View from the Bottom", *Landscape Architecture*, December 1994. p.46

[96] Leccese, Michael, "Rocky Mountain Retrofit", *Landscape Architecture*, May 1998. p. 58

[97] Current management systems depend on antiquated sewers and retention basins, which do not remove pollutants acquired by the water as it travels through these systems or allow it to infiltrate and recharge groundwater.

[98] Wenk, William and Billy Gregg, "Stormwater Gardens", *Landscape Journal Special Issue*, 1998. p. 24

[99] Ferguson, Bruce K , "The Failure of Detention and the Future of Stormwater Design", *Landscape Architecture*, December 1991. p. 76

recharging (this accounted for 25% of stormwater in the woodland environment)[100], and by exposing the water to heat and sunlight in detention basins, the quality of the water is further compromised. "As water flows off of hot roads and parking lots [and by implication rooftops which drain onto ground level impervious surfaces] the water temperature in streams rises, lowering the amount of dissolved oxygen available in the water. Many conventional stormwater management structures, such as extended detention basins, can actually cause stream warming through increased solar radiation."[101] By blindly paving mile after mile of virgin land, development has manufactured a problem of stormwater runoff. The current practices of development have polluted stormwater, and attempts at management have further corrupted it. What was once rainwater is now toxin, and paving is one of the primary culprits.

Parking lots are one of the greatest generators of polluted and poorly managed stormwater runoff, among other environmental problems.

> …expanses of open asphalt impacted hydrology and climate across city space. Runoff from flat surfaces could amplify flooding not only in a downtown but also well downstream from a city's center…Parking lots were a major source of water pollution. Oil, grease, hydrocarbons and heavy metals, in addition to suspended solids and trash, washed into river basins. Largely unshaded parking lots became exaggerated heat islands contributing substantially to air pollution, altering precipitation regimes and exacerbating wind speeds…In addition, the very process of applying asphalt to street and parking lot surfaces was found to add substantially to local smog build up.[102]

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[100] McCoy, Susan, "Blue-Green Technology: An Innovative Approach to Stormwater Management", *Urban Land*, March 1998. p. 19

[101] Echols, Stuart Patton, "Responsible Stormwater Management", *Urban Land*, June 1996. p. 48

[102] Jackle 97

However, they also offer a tremendous opportunity to reverse these destructive behavioral trends, through the implementation of one or more (as appropriate) of seven basic techniques: rain gardens, smart ponds, permeable pavements, topography, landscaping and rainwater harvesting, and green roofs.

Rain Gardens: "Rain gardens are small-scale stormwater infiltration devices that may replace these detention basins while providing the benefits of groundwater recharge, beauty, and wildlife habitat."[103] They are typically depressions in the ground's surface (to maximize water flow), filled with both gravel and permeable soils and planted with moisture tolerant plants, notably excluding grass, which line most conventional detention basins. They are very similar to the new generation of bioswales, which are "lined with crushed stone, planted with lush, exuberant wetland species rather than grass, and fitted with small weirs that slow runoff as it enters a swale, giving it a chance to soak into the soil rather than going directly into the storm drain."[104] Rain gardens and bioswales are more cost effective than the best management practices (conventional stormwater management systems). They require less excavations, piping and concrete[105], and are far more effective. They also enhance the landscape rather than detract from it. In parking lots, rain gardens can be used as linear parks along boundary conditions in place of the current raised grass medians, which have little or no effect on overall stormwater management.

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[103] Russell, Zolna, "Rain Gardens", *Landscape Architecture*, July 2000. p. 24

[104] Thompson, William, "The Poetics of Stormwater", *Landscape Architecture*, January 1999. p.62

[105] Russell, Zolna, "Rain Gardens", *Landscape Architecture*, July 2000. p. 24

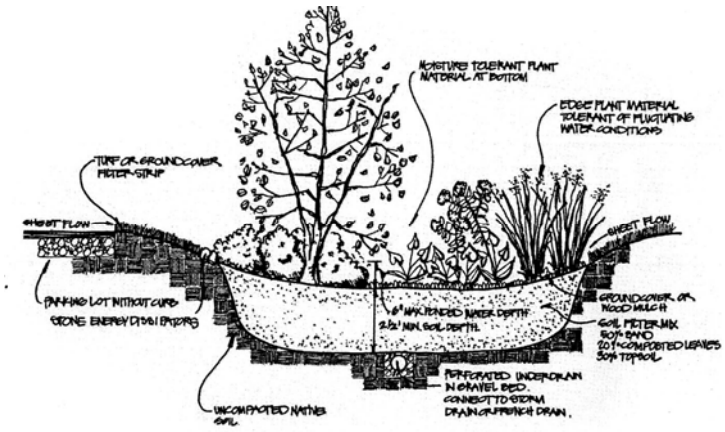

Figure A.1
Section of a Rain Garden. *Source:* Russell, Zolna, "Rain Gardens", *Landscape Architecture*, July 2000. p. 24

Smart Ponds: "Between storms they [dry ponds] are unsightly depressions that tend to collect trash. And often they fail to realize their purpose, which is to reduce flooding downstream, to improve water quality, and to maintain the area's water balance…Smart ponds control peak stormwater flow, remove pollutants from runoff, maintain natural water balances, moderate water temperatures, and stand as amenities in their own right."[106] They maintain a base water level year round, as well as a several varieties of vegetation. However, their effectiveness can be compromised by clogging from runoff, so a high level of maintenance is essential for their success. In parking lot applications, they are ideally suited to replacing detention basins and dry ponds currently found in landscaped areas surrounding large parking lots.

[106] Duffy, Stephen, "Smart Ponds for Stormwater Management", *Urban Land*, December 1992. p. 42

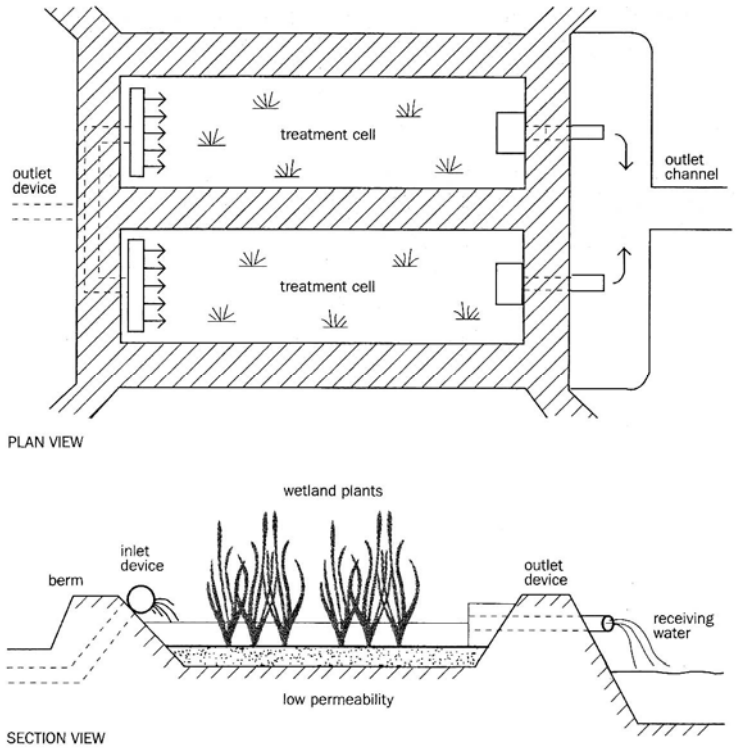

Figure A.2
Plan and Section of typical SmartPond wetland system. *Source:* Snoonian, Deborah. "Drain it Right: Wetlands for Managing Runoff", *Architectural Record*. August 2001 p. 129

Permeable Pavement: Permeable pavements, generally high aggregate, low sand compositions, allow the infiltration of water through hardscaped surfaces. "Because the open grid pavers allow a high rate of infiltration, more stormwater can be stored within the parking area, thereby reducing the area required for stormwater retention basins and reclaiming it more developable land."[107] However, like other infiltration systems, they can clog, necessitating costly cleaning or repaving. Additionally they are well to specific soil types and very poorly suited to others.[108]

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[107] Kinkade-Levario, Heather, "Integrated Water Conservation Strategies for LEED Points", *Landscape Architecture*, April 2004. p. 60

[108] They are better suited to rockier, more stable soils as opposed to clay based volatile soils. (Leccese, Michael, "Rocky Mountain Retrofit", *Landscape Architecture*, May 1998. p. 62)

Topography: Sidewalks, drives and parking lots should slope towards open space, rain gardens and smart ponds to maximize their water retention and infiltration capabilities and minimize street flooding.

Landscaping: Appropriate landscaping can increase water infiltration and purification, reduce heat island effect and improve overall aesthetic. "Also, landscaping with evergreen trees can shade western and southern exposure to mitigate solar heating of water. Deciduous trees should be kept back from the ponds [retention and smart] to avoid excessive accumulation of leaf litter."[109] Parking lot islands should be sunken to allow for infiltration, and trees and vegetation should be planted so that root systems do not disturb paved surfaces or compromise visibility.

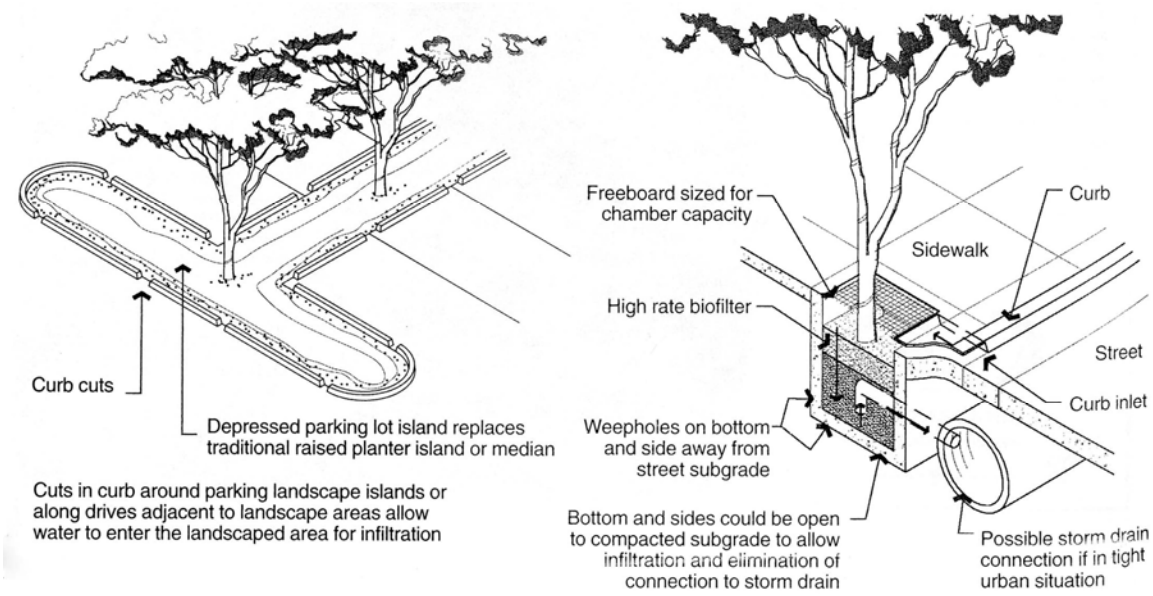

Figure A.3
Depressed parking lot island and subterranean biofilter. *Source:* Kinkade-Levario, Heather, "Integrated Water Conservation Strategies for LEED Points", *Landscape Architecture*, April 2004. p. 56

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[109] "Stormwater Ponds", *Landscape Architecture*, April 2000. p. 54

Rainwater Harvesting: Rainwater is a valuable asset, not merely a waste product. If it can be collected and reused, runoff and its associated problem cannot ensue. "Rainwater harvesting can be accomplished with rain gardens, green roofs and cistern systems; harvested water may be detained, infiltrated, or reused for such purposes as irrigation, washing cars and flushing toilets."[110] The rainwater harvesting method can be used to supply a variety of non-potable uses and is one of the easiest and most cost-effective measures to implement. Simple steps, such as changing gutters to scuppers feeding into cisterns, can often have a significant impact. It is also one of the most active changes in the conception of stormwater; viewing it as resource and not as nuisance.

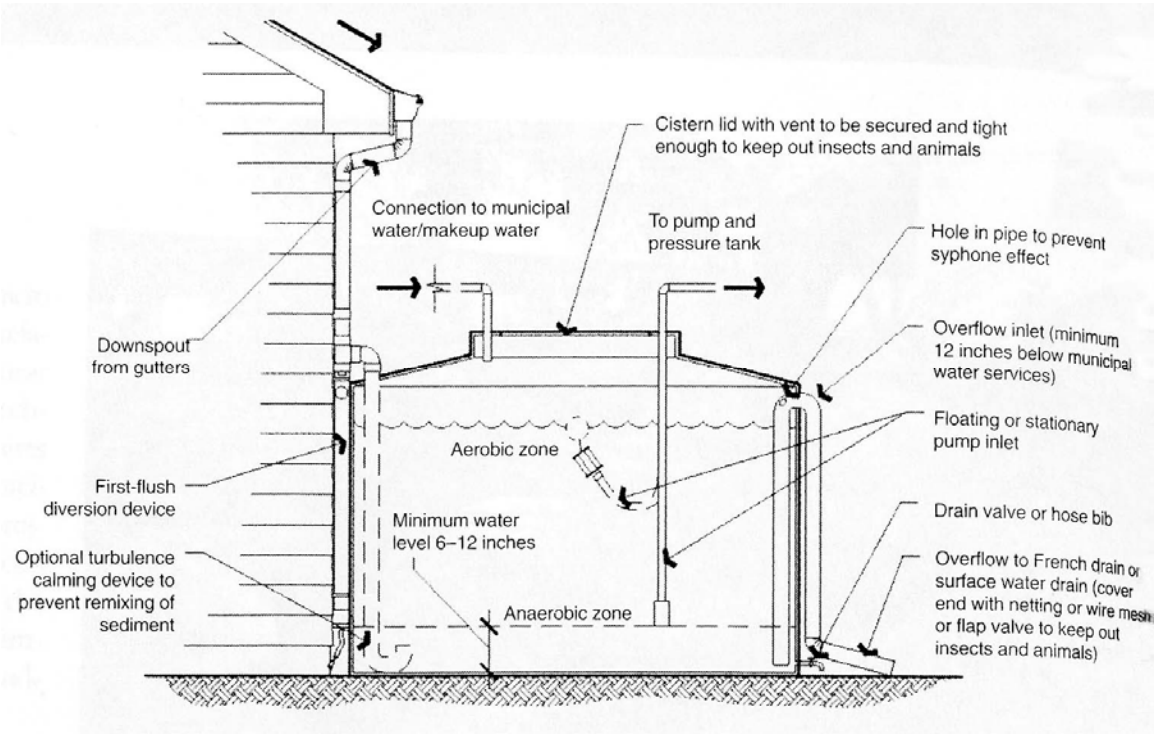

Figure A.4
Water Collection System. *Source:* Kinkade-Levario, Heather, "Integrated Water Conservation Strategies for LEED Points", *Landscape Architecture*, April 2004. p. 54

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[110] Kinkade-Levario, Heather, "Integrated Water Conservation Strategies for LEED Points", *Landscape Architecture*, April 2004. p. 54

Green Roofs: Although they are not actually a treatment of the parking lot proper, green roofs can have an enormous impact on stormwater runoff and heat island effect. Normally, all water that falls on the roof of a building is collected in gutters and is drained down to ground level, frequently to a paved surface. Depending on the size of the building, type of roof, and condition of mechanical systems, a tremendous amount of water can accumulate and transport a significant quantity of pollutants. Additionally, rooftops can reach temperatures of over 180 ° Farenheit[111], which can result in a great deal of hot polluted water. However, an extensive green roof creates little or no runoff (less than 25%, which is treated post storm, by the roof's vegetation[112]); all water that falls on the roof is effectively removed from stormwater runoff calculations.[113] There are other benefits as well. "Not only aesthetically pleasing, the rood garden is expected to lower the roof's temperature, provide thermal and acoustic insulation, control stormwater, convert carbon dioxide to oxygen, and reduce smog, as well as last longer than a traditional rooftop, pay for itself over a period of years, and even attract birds and butterflies…a 22,000 square foot green roof is expected to save between $3,000 and $4,000 a year in heating and cooling costs…and extend the life expectancy of the roofing system by 2 to 3 times."[114]

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[111] Scholtz-Barth, Katrin, "Green on Top", *Urban Land*, June 2001. p. 87

[112] Scholtz-Barth, Katrin, "Green on Top", *Urban Land*, June 2001. p. 87

[113] Kinkade-Levario, Heather, "Integrated Water Conservation Strategies for LEED Points", *Landscape Architecture*, April 2004. p. 60

[114] Scholtz-Barth, Katrin, "Green on Top", *Urban Land*, June 2001. p. 84, 87

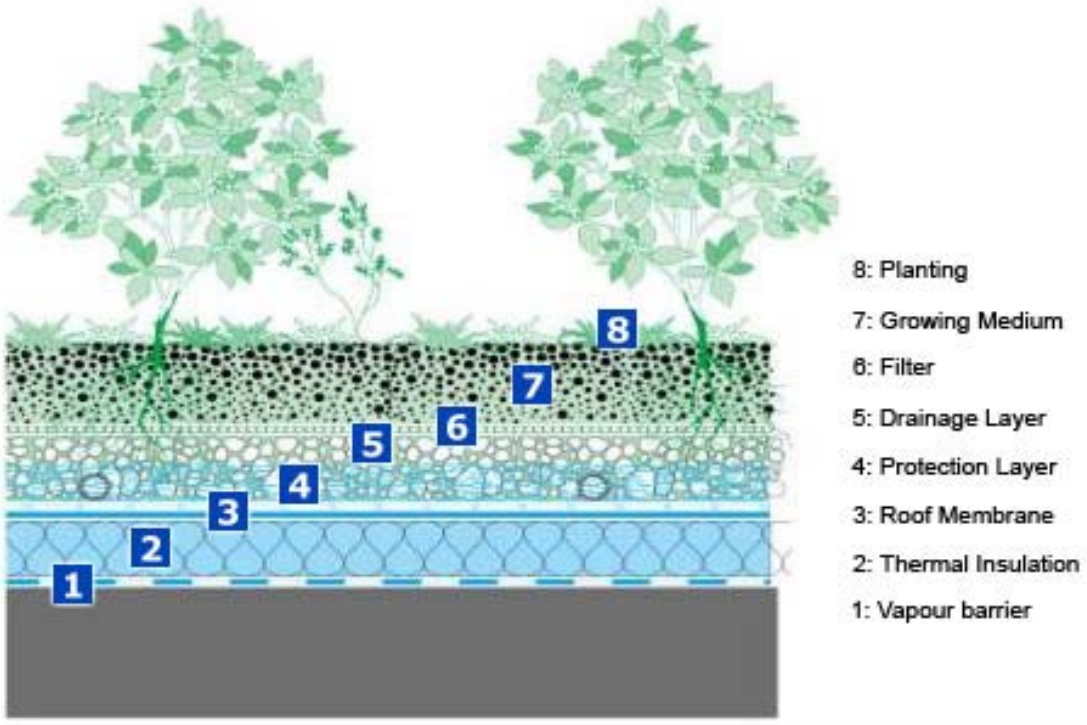

Figure A.5
Section of extensive roof garden construction. *Source:* www.miller-roofscapes.co.uk/c/gardenroofs_construction.html

CONCLUSION

The strategies outlined here, when properly implemented, should significantly reduce stormwater runoff and its associated problems of air pollution and heat island effect. Their importance can not be overemphasized, particularly for parking lot design, as surface parking lots are one of the most environmentally deleterious elements of the twentieth century city. Public space should be healthy space, and given the current environmental situation in the United States, all new projects should be undertaken with an eye towards environmental sensitivity.

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