Cambridge in Transition: Regulating Parking in a Growing City

by

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ABSTRACT

Parking is regulated today by cities to achieve a variety of goals including traffic reduction, air quality improvement, urban densification, and climate change mitigation. In the City of Cambridge, Massachusetts, parking regulation has proven to be a highly contentious dimension of local development politics. In 1973, the US EPA promulgated a cap on non-residential parking supply in Cambridge as part of efforts to bring the Boston metropolitan area into compliance with Clear Air Act ambient air quality standards. Until 1997 the City of Cambridge administered the highly controversial parking "freeze," which garnered opposition from developers, businesses, and their allies within city government, as well as strong support from neighborhood activists who hoped the freeze would limit development. Debate over the parking freeze led to efforts by Cambridge planning and transportation staff to recast the parking freeze as a suite of policies targeting demand for driving, particularly among employee commuters.

Cambridge has grown significantly over the past two decades and is poised to grow further, providing the impetus for research into the city's experience with parking regulations and travel demand management policies. Analysis of the history, implementation, and effects of Cambridge's parking policies yields several key conclusions. First, the City developed its parking policies in response to a series of external federal, state and local mandates in the form of regulations, lawsuits, and petitions. These events precipitated debates over the role that parking policies should play between groups that in this thesis are called the local "growth coalition," or development interests, neighborhood "limited growth" activists, and government "planned density" bureaucrats. Debates between these three groups dramatically shaped the form that Cambridge's policies now take. Second, past and current parking policies have facilitated the existence of many underused parking spaces in the city, which undermine the effectiveness of City policies that target commuter driving. Finally, although concerns about the impacts of parking policies on economic development still exist in Cambridge, anticipated growth presents an opportunity for the City to revisit its parking policies. Revised policies could more effectively enable the shared use of existing parking spaces, increase employee awareness of commuter benefits, and make the costs of parking more transparent and representative of their physical, social, and environmental impacts.

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ACRONYMS

CDD	Community Development Department of the City of Cambridge
CRA	Cambridge Residents Alliance
CRGM	Cambridge Residents for Growth Management
CRTMA	Charles River Transportation Management Association
CSI	Cambridge Systematics, Inc.
CTPS	Central Transportation Planning Staff
EOEA	Massachusetts Executive Office of Environmental Affairs
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
GMAC	Growth Management Advisory Committee
IPOP	Interim Planning Overlay Permit
MassDEP	Massachusetts Department of Environmental Protection
MBTA	Massachusetts Bay Transit Authority
MIT	Massachusetts Institute of Technology
MITIMCo	MIT Investment Management Company
MOA	Memorandum of Agreement
PTDM	Parking and Transportation Demand Management
PUD	Planned Unit Development
SIP	State Implementation Plan
TCP	Transportation Control Plan
TDM	travel demand measure
TPT	Traffic, Parking, and Transportation Department of the City of Cambridge
VMT	Vehicle Miles Traveled
VTRO	Vehicle Trip Reduction Ordinance
VTRP	Vehicle Trip Reduction Program

INTRODUCTION – CAMBRIDGE IN TRANSITION

Parking Policy in a Growing City

In July 2012, the *Boston Globe* reported a paradox: between 2000 and 2010, the Kendall Square area of the City of Cambridge added almost four million square feet of commercial and residential development (a 38 percent increase) while traffic on its three main thoroughfares decreased by around 14 percent. The newspaper heralded the announcement as a triumph for the city's parking and travel demand management policies (Moskowitz 2012) (City of Cambridge K2C2 Transportation 2013).

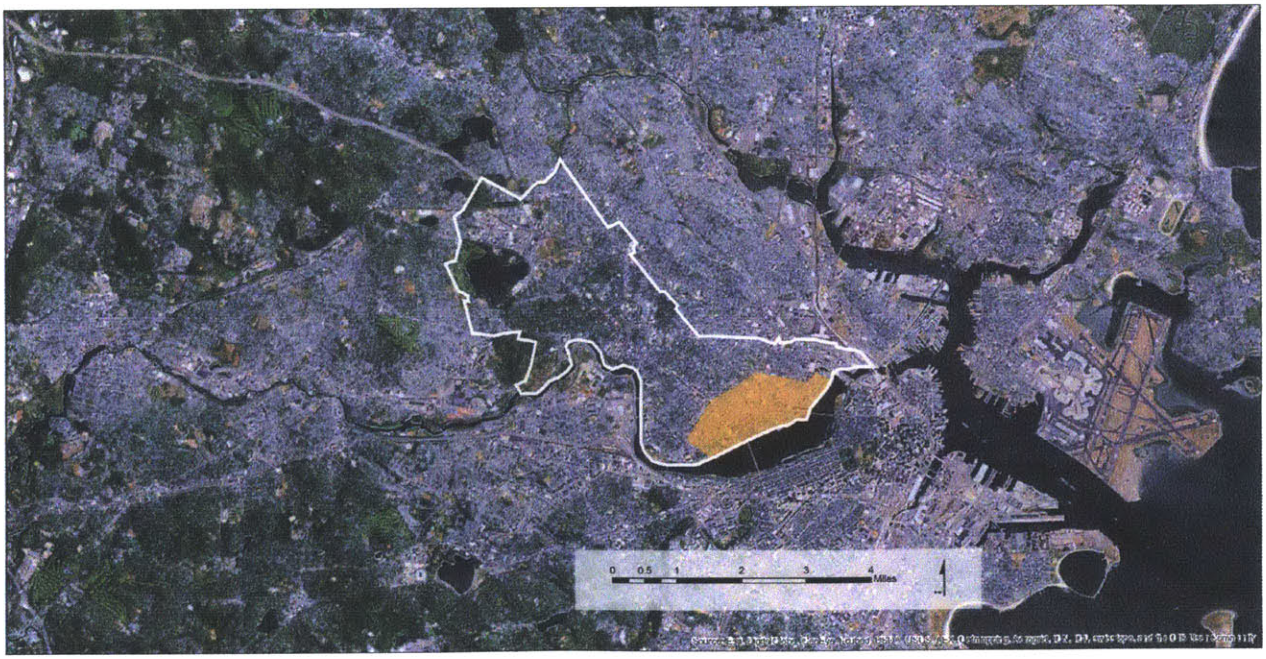
Cambridge's parking and travel demand policies originated not from within City government, but in response to federal, state, and local mandates in the form of regulations, lawsuits, and petitions. Three events represent three decades of conflict between city officials, neighborhood activists, developers, environmental advocacy groups, and state and federal authorities over parking arising from different conceptions of the relationship between parking and city livability, regional competitiveness, and environmental quality. The debates that shaped Cambridge's current parking policies are not simply a relic of Cambridge history, but are alive and well today. The city is preparing for an additional 8.5 million square feet of new development by 2030 in the Central Square and Kendall Square areas of Cambridge, an 80 percent increase and 3.2 million square feet more than currently allowed by zoning. City staff and planning consultants estimate that 80 percent of expected growth will directly serve office and research uses (City of Cambridge 2011a). The City's plans have ignited debate over the impacts of development on traffic and on transportation system capacity (City of Cambridge 2013b), creating the need for greater understanding of the city's past, current, and possible future parking and travel demand policies.

Lessons from Cambridge's experience regulating parking and travel demand are relevant outside of the city, as well. Transportation represents 27 percent of total US greenhouse gas emissions, with passenger vehicles alone accounting for 790 million metric tons of CO_2 equivalents, or 43 percent

of 2010 US transportation emissions (US EPA 2012). As a result, state and local governments are implementing policies designed to reduce mobile-source greenhouse gases and criteria pollutants by reducing vehicle miles traveled (VMT) (Mahendra 2012). In 2009, work commuting accounted for 16 percent of person trips per household and almost 28 percent of all VMT in the United States (National Household Travel Survey 2009). States and cities around the US have much to gain from reducing commuter VMT through initiatives such as Massachusetts' "Rideshare" program, which targets commuters at the state's largest employers (310 CMR §7.16).

To investigate the efficacy of policies designed to reduce automotive commuting, this thesis analyzes the origins and the impacts of the City of Cambridge's non-residential parking and travel demand policies. Chapter One examines the regulation of parking supply in Cambridge over time, focusing first on how the practice of ensuring "enough" parking through zoning was dramatically threatened by a federal rule, a "freeze" on allowable non-residential parking in the city. Chapter Two examines how debate over the freeze resulted in its replacement with a suite of parking and travel demand policies. Chapter Three considers what effects these policies have had on Cty institutional capacity, development, parking supply, and commuter mode choice through analysis of case study developments in the areas of Kendall Square and eastern Cambridgeport.

Figure 1-1: Cambridge in Context with Kendall Square and Eastern Cambridgeport



The City of Cambridge has transformed over the past four decades. US Census Bureau data show that from 1970 to 2010 the Cambridge workforce increased by 48 percent while population increased by 10 percent (see Figure 1-2). Population has still not returned to its peak of 120,700 in 1950, which along with increases in the proportion of Cambridge employees residing outside of Cambridge indicates Cambridge's increasing status as a regional employment center. Since 1970 new construction has increased total taxable non-residential development by 120 percent. The most intense periods of new construction took place in the late 1980s and early 2000s (City of Cambridge 2011b).

Figure 1-2: Cambridge In Transition (1970-2010)

Year	1970	2010	Change
Residents	95,300	105,200	+10%
Employees	76,112	112,319	+48%
Employees residing in Cambridge	29% (22,072)	21% (23,362)	-8%
Employees residing in abutting towns	37% (28,085)	32% (36,055)	-5%
Employees residing elsewhere	34% (25,955)	47% (52,902)	+13%
Total non-residential square feet	16 million	35 million	+120%

Source: City of Cambridge 2011b

Two areas that have undergone particularly significant redevelopment in the past thirty years are the former industrial areas of eastern Cambridgeport and Kendall Square, highlighted in Figure 1-1. Once home to factories, warehouses, and worker homes, by the mid-1960s the city considered these areas blighted and began implementing an urban renewal plan comprising rezoning and redevelopment planning (Cambridge Redevelopment Authority 1965). During the late 1960s, a state proposal to construct the "Inner Belt" highway through Kendall Square and Cambridgeport with federal funds incited organized resident opposition in these neighborhoods, and others in Cambridge and surrounding municipalities. The Inner Belt left a legacy of neighborhood activism that in later decades included opposition to the pace and intensity of redevelopment in Kendall Square and Cambridgeport (McManus 2013). These neighborhoods are thus worthwhile starting

points for examining the evolution of Cambridge parking policies in the context of Cambridge growth.

Introducing the Actors

Cambridge's current parking policies were shaped dramatically by conflict between stakeholders in Cambridge development politics who hold one of three sets of views regarding the desirability of regulating parking in a growing city. These groups are called here the Cambridge growth coalition, limited growth activists, and planned growth advocates, whose views are summarized below and in Figure 1-2.

Figure 1-2: Growth Groups in Cambridge Parking Policy History

	Growth Coalition	Limited Growth	Planned Growth
Growth should be:	encouraged to support tax base	limited, controlled	planned, managed
Livability as:	resulting from ample funds for city services and programs	low-density, neighborhoods, little traffic, affordability	density, mixed use, transit, walking, biking
Parking:	no caps or controls to avoiding harming development	caps on parking to limit total development	should be minimized; debate over whether parking cap is effective
Characterized by others as:	for growth at any cost	anti-growth	bureaucrats, technocrats

Cambridge Growth Coalition

Some political economists and sociologists consider local growth coalitions, comprised of individuals who invest in land and property, to be the foundation for local power in many American cities. As G. William Domhoff (2005) writes,

> "A local power structure is at its core an aggregate of land-based interests that profit from increasingly intensive use of land... Starting from the level of individual ownership of pieces of land, a "growth coalition" arises that develops a "we" feeling among its members even if they differ on other kinds of political and social issues."

To boost property values, growth coalitions support policies that increase population, commercial space, corporate offices, research activities and associated financial activity. To support outside

investment, they favor low business taxes, infrastructure expansion, and minimal business regulations. Growth coalitions rely heavily on government to provide infrastructure and other public services to keep property values high (Domhoff 2005). Logan and Molotch (2007) have found the growth coalition to be overrepresented on local city councils. Elected officials serve as important allies, become ambassadors to possible investors, and strive to attain competitive advantage over other cities (Domhoff 2005). Logan and Molotch (2007) cite universities, motivated to increase the value of local real estate holdings, as common auxiliary players in growth politics. Both Harvard University and the Massachusetts Institute of Technology are major real estate owners in Cambridge. MIT owns significant amounts of land in Kendall Square, and has featured prominently in past and current battles over development, not least because local real estate development is an important component of the Institute's investment activities.[1]

Acting to protect and expand the city's commercial tax base, the Cambridge growth coalition has perceived regulations on non-residential, and particularly on employee, parking supply as a threat to the city's ability to attract businesses (Barnes 1990, Nawaday 1992). Individuals in Cambridge who have fought parking policies on these grounds have included longtime Cambridge City Manager Robert Healy, members of the Chamber of Commerce, some members of City Council, and developers.

Limited Growth Activists

Groups of limited, or controlled, growth activists in Cambridge organized in direct response to the actions of the growth coalition. Indeed, as Dumhoff (2005) wrote of local growth coalitions in the continuation of the excerpt above:

> "This "we" feeling is reinforced by the fact that the pro-growth landed interests soon attract a set of staunch opponents--if not immediately, then soon after they are successful. These opponents are most often neighborhoods and environmentalists, which are sometimes aided by university students and left activists."

In the late 1960s opposition to the proposed Inner Belt united many Cambridge residents and left a legacy of organized resistance to development that threatened residents' conceptions of

[1] MIT's real estate tax payments of over $36 million to the City of Cambridge for 2012 accounted for 12.2 percent of the City's total tax revenue (MIT 2012), the largest single payment by any institution to the City (City of Cambridge 2012).

neighborhood livability (McManus 2013). Over the following decades, citizen activism reignited in response to redevelopment proposals and plans. In the 1980s, the group Cambridge Citizens for Livable Neighborhoods united members of neighborhoods associations from around the city in opposition to large-scale development taking place near Alewife Station, East Cambridge, and MIT (Geer 2013). The 1990s saw a fresh wave of resident activism against large-scale developments in East Cambridge led by the group Cambridge Residents for Growth Management (CRGM 2013a). Today, the group Cambridge Residents Alliance opposes planned upzoning and developments in Cambridgeport, Central Square and Kendall Square (CRA 2013). While easily characterized as "anti-growth," calling this group "limited growth" activists refers to a more nuanced position conveyed both by former activists in interviews (Geer 2013, McManus 2013), and by the self-named group Cambridge Residents for Growth Management, which focused on limiting the impacts of development on neighborhood quality of life (CRGM 2013b).

The positions taken by limited growth activists in Cambridge in response to proposed development indicate a conviction that development is not value-neutral. Critical of the common growth coalition argument that growth is about jobs, not profits (Domhoff 2005), limited growth activists counter that new development benefits developers disproportionately. Limited growth advocates argue that neighborhoods pay the true cost of land use intensification through loss of family-friendly, affordable neighborhoods and traffic, environmental, and social impacts. Because of their focus on limiting development, the actions of limited growth activists suggest that they favor parking and travel demand policies only to the extent that these policies limit total development, particularly through zoning amendments. As a result, they have clashed both with the Cambridge Growth Coalition and with Planned Density advocates.

Planned Density Advocates

Planned density advocates, the most loosely defined group of the three discussed here, largely comprise government actors. Like the local growth coalition and its allies, they support densification and development. As professional planners and agency officials, they have tended to promote policies designed to achieve a vision of urban livability and sustainability featuring transit and other forms of non-automotive transportation. Advocates of this approach throughout the history of Cambridge's parking policies have included city planning and transportation staff, state officials and staff at the Massachusetts Executive Office of Environmental Affairs and Department of

Environmental Protection (MassDEP), and regional staff at the US Environmental Protection Agency (EPA).

Planned density advocates share common ground with limited growth activists; both acknowledge threats to neighborhood livability and affordability from development. A July 1999 memo from Cambridge Community Development staff to the Planning Board reported on the efforts of a city Growth Management Advisory Committee, appointed by the City Manager at the request of the City Council in response to resident concern about Cambridge past and future growth. In this memo, staff reported on recent development trends, such as:

- Rising housing costs resulting from "regional market forces, coupled with the end of rent control"; [2]
- Job growth outpacing residential growth over the past 30 years, and a declining proportion of Cambridge residents working in Cambridge;
- Declining school enrollment, smaller families, more childless adults;
- Increasing traffic due to some pass-through traffic, but particularly from increased commuting in and out of the city, and more affluent multi-car households.

The policy responses favored by planned density advocates differ starkly from those supported by limited growth advocates. In response to the trends described above, in the same internal memo planning staff recommended "providing opportunities for people to both live and work within the City" by increasing housing supply, encouraging mixed-use development, and facilitating non-automotive travel (City of Cambridge1999). Important underpinnings for the positions taken by many planned density advocates come from a seminal 1977 study by Pushkarev and Zupan, who argued that urban density is constrained by transportation systems that feature only automobiles and not transit. Planned density advocates understand parking management policies both as means of mitigating the negative externalities of driving, including air pollution and congestion, and as means of reducing urban sprawl by reducing the amount of valuable urban space devoted to the automobile. Todd Litman's 2006 book *Parking Management Best Practices*, published by the American Planning Association, exemplifies a planned density approach to parking, which includes reducing parking supply, increasing the price of employee parking, and encouraging shared parking. The book highlights the attention planned density advocates give both to economic rationales

[2] Rent control was a defining element of Cambridge politics until it was abolished by statewide referendum in 1994 (Geer 2013).

parking to support growth as well as to mitigation of the negative impacts of parking and driving (Litman 2006).

Introducing the Freeze

Planned density advocates generally agree that managing demand for driving is a crucial avenue for city policies to reduce pollution, traffic, energy use, and increase urban density. Analysis of conflict surrounding Cambridge's policies reveals disagreement among planned density advocates over whether discouraging commuting and driving in a growing city should, or must, include limits on non-residential parking supply. In 1973, the US EPA, with the support of state and local officials, promulgated a freeze on non-residential parking supply in Cambridge and Boston as part of the Massachusetts State Implementation Plans (SIPs), sets of laws, regulations, policies, and agreements that outline a state's intended path to compliance with Clear Air Act ambient air quality standards for "criteria" pollutants, such as carbon monoxide and ozone. In the following decades support for the Cambridge freeze among all levels of government waned significantly. By the early 1990s, some in federal and in state government were ambivalent to the freeze as an air quality policy (CCLN 1998).[3]

In Cambridge City Hall, initial support for the freeze turned quickly to opposition. The Cambridge growth coalition in particular considered the parking freeze damaging to the city's regional competitiveness, and city officials administered a weakened freeze until a 1988 lawsuit brought by limited growth activists brought the city's actions to light (*McManus et al., vs. Teso et al.,*). As a result, In August 1990 the City Manager of Cambridge and Commissioner of MassDEP signed a memorandum of agreement "to cooperate in an effort to amend" the SIP with transportation control measures "including but not limited to ... a parking freeze" (City of Cambridge and MassDEP 1990). By distinguishing between "a" freeze and "the" 1975 parking freeze, this language opened the door for the original freeze to be replaced (Jacobs 2013). The City agreed to

[3] During court proceedings for a lawsuit filed by developers against the City of Cambridge over parking permit distribution, court records of the depositions of two MassDEP officials at the time, Andrew Savitz and Barbara Kwetz, indicate that the state was not going to force the City of Cambridge to continue implementing the original parking freeze in part because staff doubted it was serving its purpose of improving air quality. These materials are available at the Middlesex County Superior Court under Docket No. 90-6444-E (*Robert A. Jones, et al., vs. George Teso, et al.*).

implement the 1975 freeze during the interim period before a new SIP was adopted (City of Cambridge and MassDEP MOA 1990).

Recasting the Freeze

The City of Cambridge knew that EPA and the Commonwealth would not rescind the freeze without assurance that substitute policies would achieve at minimum equivalent air quality and vehicle trip reduction benefits. By October 1990 city staff and outside consultants had begun developing the components of what would become the Vehicle Trip Reduction Ordinance (VTRO) (Jacobs 1990). The VTRO, adopted by City Council in 1992, committed Cambridge to expand bike and commuter programs (Code of Ordinances §10.17.50), consider revising required parking ratios in the zoning ordinance (§10.17.080), improve coordination with the Massachusetts Bay Transit Authority (MBTA) (§10.17.090), and collect baseline commute data toward the development of an employer-based vehicle trip reduction program (§10.17.130). The VTRO is considered the blueprint for the city's subsequent efforts to promote alternative transportation (Rasmussen 2013). A draft version of the VTRO proposed measures requiring non-residential developments of more than 50,000 square feet to submit a traffic study and travel demand plan to the Planning Board as a permit requirement.[4] While not adopted by City Council in the 1992 VTRO, these drafts prefigure two important elements of the city's current parking policy suite: the Parking and Transportation Demand Management Ordinance and Zoning Ordinance Article 19.

In 1998 the City Council passed the Parking and Transportation Demand Management (PTDM) Ordinance, which requires parking facilities constructed or modified from that point to adopt travel demand measures. The PTDM Ordinance requires the owners of new and expanding parking facilities to adopt travel demand measures (TDMs) such as providing MBTA pass subsidies for employees, providing preferential parking spaces for carpool users, and installing secure bike racks and shower facilities for employees (§10.18.050). In addition, the City developed the Commercial Parking Freeze Ordinance, which limits only the number of commercial parking spaces in the city, defined as those available to the public for a fee and excluding employer spaces (§10.16.010).

[4] Staff at the City of Cambridge Community Development Department kindly provided a copy of the draft ordinance, dated March 29, 1991 along with many other files from the Vehicle Trip Reduction Program's history.

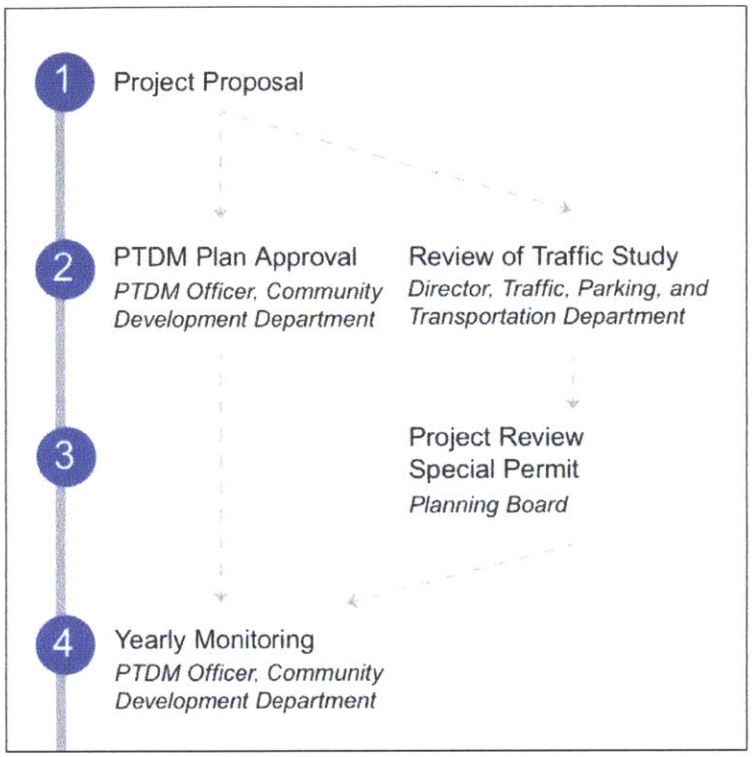
In 1998 the group Cambridge Residents for Growth Management successfully petitioned the City Council to adopt an interim zoning article ("IPOP") based upon the draft traffic mitigation ordinance originally proposed as part of the Vehicle Trip Reduction Program. IPOP required new developments to conduct traffic studies and authorized the Planning Board to condition new development on traffic mitigation measures. In 2001 City Council made IPOP provisions permanent as Article 19 of the Zoning Ordinance (Clippinger 2013). Article 19 "Project Review" requires developers of proposed non-residential projects of more than 50,000 square feet to submit a traffic study to the city. Before the development can receive a Project Review Special Permit, the Director of the Traffic, Parking, and Transportation (TPT) Department must certify the traffic study as "accurate and reliable" and determine that the proposal will not have a "substantial adverse impact" on study area traffic using the criteria of peak trips, anticipated use of nearby streets, and intersection crash data (Z.O. §19.24). The Director of TPT can also recommend that the Cambridge Planning Board condition special permit approval on a reduction in allowable parking spaces and the adoption of travel demand measures (Clippinger 2013).

In 1998 MassDEP accepted these policies and others, together called the Vehicle Trip Reduction Program (VTRP), as a replacement for the original Cambridge parking freeze in the state SIP for ozone and carbon monoxide. The agency promulgated a rule indicating that the VTRP would offset any "VMT associated with the issuance of new commercial parking space permits in Cambridge in excess of the number allowed by the Cambridge Parking Freeze" (310 CMR §60.04). In September 2000 EPA published a proposed rule that amended the Massachusetts SIP for ozone and carbon monoxide by replacing the 1975 Cambridge parking freeze with the City's Vehicle Trip Reduction Program (65 FR §181, 56278). The agency never promulgated a final rule, apparently due to opposition from pro-freeze advocates.

The policies that resulted from the City's efforts to replace the parking freeze—the Vehicle Trip Reduction Program, the Parking and Transportation Demand Ordinance, and Zoning Ordinance Article 19—greatly enhanced the capacity of city staff to implement their own principles of planned

density by mitigating the negative externalities of density and development. The opportunities for staff review of large projects[5] proposing to add parking is shown in Figure 1-3.

Figure 1-3: Current Staff Review of Parking and Travel Demand for Large Projects



Evaluating the City of Cambridge's Parking Policies

Current city ordinances and policies provide opportunities throughout the development process for the City to influence both parking supply and demand for commuter parking. The Planning Board can require the adoption of travel demand measures through Zoning Article 19, and the PTDM Officer can shape the travel demand measures adopted in project PTDM plans. Prior to the PTDM Ordinance and IPOP, later Zoning Article 19, the Planning Board could condition development on travel demand measures. The PTDM Ordinance greatly enhanced the staff capacity to monitor travel demand measure implementation and effects. Yearly monitoring provides staff with data they then use to make future recommendations to the Planning Board

[5] Article 19 applies to all non-residential developments over 50,000 square feet, and to some categories of projects that meet lower size thresholds, such as childcare facilities, healthcare facilities, medical offices, and banks (Z.O. §19.23)

regarding traffic and parking (Clippinger 2013). The impacts of the PTDM Ordinance and Article 19 include:

- Implementation of travel demand policies by Cambridge's largest employers, beyond what would otherwise be provided, contributing to reduced demand for drive alone commuting;
- Adoption of an unofficial freeze on parking at MIT since 1998 to avoid being subject to the PTDM Ordinance (Brown 2013b);
- Reduction in the financial desirability of commercial parking due to the PTDM Ordinance requirement that commercial parking facilities offset vehicle trips (e.g., through support for area transit)(Donaher 2013);
- Some reduction in new facility parking supply compared to previous projects and to proposed developer supply.

Today parking supply at many garages in Kendall Square and Cambridgeport exceeds demand, evinced by unleased spaces as well as by recent decisions by developers to construct new buildings without or with less parking than has historically been built (Brown 2013a) (Donaher 2013) (Lyon 2013). These unused parking spaces reflect the success of city policies that work in concert with broader social, economic, and physical factors, including expanded Red Line capacity, to reduce demand for driving. They also indicate the past inability of city parking policies to reduce parking supply accordingly. At the same time, they indicate the limitations of the City's current policies and indicate that parking supply will grow so long as development continues. The City has begun restricting the maximum parking supply allowable at new developments, however assuming that new employees could use existing parking spaces, there will be a delay before supply acts as a constraining factor on mode share.

As Cambridge continues to grow, city staff, officials, and residents have the opportunity to reexamine Cambridge's existing parking policies and consider whether in the context of dramatic planned growth they are fit to their stated purposes of managing traffic (Z.O. §19.10), improving public welfare, protecting the environment, controlling air pollution (Code of Ordinances §10.18.010) and discouraging unnecessary auto use (Z.O. §6.10). As cities around the country strive to achieve these goals as well, close examination of the City of Cambridge's parking policies can inform more effective parking policies.

CHAPTER 1 – THE EVOLUTION OF PARKING SUPPLY REGULATION IN CAMBRIDGE

Up until 1992, the City regulated off-street parking primarily by managing the number of spaces constructed at developments through zoning. Because parking supply can be more concretely managed than commuter demand for driving—by counting, limiting, and even eliminating spaces—parking supply restrictions have proven more controversial than commuter demand policies in Cambridge. By 1962, the Cambridge zoning ordinance ensured that sufficient accessory parking served new developments. In 1973 a federal mandate to curb air pollution in the Boston metropolitan area under the Clean Air Act catapulted parking supply restrictions into the local political spotlight with the adoption of a "freeze" on non-residential parking. Members of the Cambridge growth coalition opposed the freeze for the same reason that limited growth activists supported it: the shared expectation that restricting new parking would restrict new development. The efforts of the City to moderate the impacts of the freeze on growth resulted led to citizen-led lawsuits against the City in the late 1980s for failing to enforce the freeze. These lawsuits culminated in staff efforts to replace the parking freeze with policies that primarily targeted commuter demand, and also included revised zoning regulations. This chapter examines the evolution of parking supply regulation in Cambridge.

Early Requirements for Employee Parking Supply

Before adopting its first non-residential parking freeze in 1975, Cambridge regulated parking through a handful of zoning mechanisms designed to ensure that office, commercial, residential, and other uses had access to "enough" parking. Since the 1960s the zoning ordinance has tailored minimum parking requirements to different uses (City of Cambridge Zoning Ordinance 1962). In Cambridge, as elsewhere, zoning requirements specify a minimum ratio of accessory parking spaces to gross floor area of new development, and define accessory parking as spaces serving a principle use (e.g., stores or offices). University of California at Los Angeles professor Donald Shoup argues that implicit in minimum parking requirements is intention to satisfy demand for *free* parking (Shoup 2005). When most zoning ordinance parking requirements were adopted in the 1940s and

1950s, traffic engineers and planners believed that requirements for off-street parking should be based on maximum possible building usage, rather than on general travel patterns (Shoup 2004, 22).[6] During these decades, many planners and traffic engineers considered the main externality associated with new parking to be spillover into residential neighborhoods if accessory supply was inadequate, and considered traffic to be a problem solvable with increased road capacity (Shoup 2005, 21). The table below simplifies the zoning requirements for office uses for different categories of zoning districts in 1962, 1970, 1980, 1997, and 2013 zoning ordinances. From the 1970s to the1990s the zoning map increased in complexity as the City Council created special districts to spur redevelopment in former industrial areas (e.g., the Kendall Square "MXD" mixed-use district, and Planned Unit Development (PUD) Districts). Today zoning across Kendall Square and eastern Cambridgeport includes a mix of the districts shown below in Figure 1-2.

Figure 1-1: Off-Street Parking Requirements for Office Developments in Different Zoning Districts (spaces per 1000 square feet gross floor area)

	Neighborhood Scale Mixed Use		**Moderate Scale Mixed Use**		**Large Scale Mixed Use**		**PUD Districts (except 3C, 4B, 5)**		**Kendall MXD**	
	*min. ground floor**				*min. ground floor**		*min. ground floor**		*min.*	
1962	2.00		n/a		1.11		n/a		n/a	
1970	2.00				1.11					
1980	2.00				1.11		1.11		5.00	
	min.	*max.*	*min.*	*max.*	*min.*	*max.*	*min.*	*max.*	*min.*	*max.*
1997	1.67	3.33	1.25	2.5	1.00	1.49	0.56	.89/1.1	0.50	n/a
2013	1.25	2.5	1.25	2.5	1.00	2.00	0.56	.89/1.1	0.50	n/a

**Minimum upper floor ratios apply, requiring half as much parking as for the ground floor.*
Sources: City of Cambridge Zoning Ordinances[7]

In addition to setting requirements for off-street parking spaces, the 1962 and subsequent editions of the City zoning ordinances ensured that parking would be easily accessible. Since 1962, the

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[6] Shoup (2005) has written extensively on this topic; for more information, see 21-65.

[7] Here neighborhood-scale refers to what in the 2013 zoning ordinance are Office 1, Business A (and related categories), Industry A-1, Industry B-2 and Industry C districts. Moderate-scale refers to Office 2, Office 2-A, Business C, and Industry A districts. Large-scale refers to Office 3, Office 3-A, Business B, Industry A-2, Industry B, and Industry B-1. Earlier zoning ordinances contain the same or corresponding districts.

zoning ordinance has required accessory parking to be located on or adjacent to the lot containing the principal use it serves, with some exceptions (Z.O. 1962 §7.3).[8] These proximity requirements indicate intention not only for parking to be convenient, but also for it to be relatively self-contained to prevent spillover. Indeed, a 1957 draft for Zoning Ordinance Article VII, concerning off-street parking and loading, began:

> "It is the intention of this ordinance that all structures and land uses be provided eventually with sufficient off-street parking spaces to meet the needs of persons making use of such structures and land uses."

This same statement of intent appeared in the 1962, 1970, and 1980 Zoning Ordinances. The language of the 1997 Ordinance added a new dimension to parking requirements, noting that zoning restrictions are intended to "reduce traffic congestion and thereby promote the safety and welfare of the public" and "meet the reasonable needs of all building and land users without establishing regulations which unnecessarily encourage automobile usage" (Cambridge Zoning Ordinance 1997 §6.11).[9] The revised statement of intent reflects that by that time the planning community had recognized that off-street parking requirements consumed significant amounts of land, harmed the design of urban spaces, and encouraged overuse of cars (Shoup 2005, 23).

Calls for Zoning Change from Cambridge Residents for Growth Management

This relationship between parking, traffic, and neighborhood character has concerned Cambridge residents' groups for over forty years. In the late 1960s, some anti-highway activists had supported the idea of a freeze on parking, along with more transit and no new highways, to encourage transit-oriented growth (Salvucci 2013). In the late 1990s, limited growth advocates proposed amending zoning to limit total development and therefore limit traffic. Upset by large-scale commercial development in Alewife and Kendall Square, in 1997 a group called Cambridge Residents for Growth Management (CRGM) introduced a zoning petition to City Council calling for downzoning, height restrictions, public design review, affordable housing, and open space across the city. The first of four goals of the petition was "Limit total development to control growth of traffic and excessive congestion of the streets" (CRGM 2013c).

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[8] Today exceptions include developments in special districts (e.g., Planned Unit Development districts in Kendall Square) and institutional uses (Z.O. 2013 §6. 22.1).

[9] The stated intent of parking regulations in the1997 zoning ordinance is furthermore "to encourage public transit, bicycle usage and walking in lieu of automobiles where a choice of travel mode exists" (Z.O.1997 §6.11). Similar language appears in the 2013 ordinance (Z.O. 2013 §6.11).

Cambridge Residents for Growth Management members chose the group's name to underscore their concern that, despite having adopted a 1993 citywide Growth Policy, the City was not doing enough to manage the effects of growth, including traffic (Pitkin 2013). The Growth Policy document, which notes its origins in conversations between the City Council, Planning Board, and Community Development Department in spring 1991, states that: "Parking availability is a major source of traffic generation in commercial developments and a major disincentive to the use of alternative means of mobility." Continuing on, the City policy asserted that "[P]arking supply should be controlled in private developments to limit the incentive to use the automobile and to increase the incentive to use alternative means of transportation," but contained no specific recommendations (City of Cambridge 1993, 74). A GRGM petition from 1998 summarizes the values and interests of Cambridge's limited growth advocates during the time regarding parking and development:

- Whereas continued, rapid development as allowed and encouraged by the City's policies and zoning regulations has greatly increased the City's tax revenues but has also expanded the number of personnel in local businesses and institutions at a rate that threatens the diversity of Cambridge's population and the vitality of its neighborhoods; and...
- Whereas this growth has brought traffic that taxes the capacity of our streets, causes undue congestion and disrupts life in residential neighborhoods... (CRGM 2013c).

The zoning petition developed by CRGM reached well beyond traffic and parking however, seeking comprehensive reform of Cambridge's zoning ordinance to protect neighborhood quality of life through FAR ("floor area ratio," a measure of density) restrictions, downzoning, housing requirements, and other measures (CRGM 2013a). Former CRGM member John Pitkin remembers that a core group of twelve met every two weeks for two years to develop the CRGM petition. The group benefit from internal planning, architecture, and legal expertise, and Pitkin recalls that as a result, developers and their allies were unable to criticize the petition as an amateur effort, and if anything felt outmatched by the group's careful research (Pitkin 2013). In response to CRGM's 1997 zoning petition, the City Council directed the City Manager to appoint a citywide Growth Management Advisory Committee (GMAC), which included residents, including Pitkin, developers, and city staff (Pitkin 2013).

Zoning petitions in Cambridge result in unofficial development moratoriums until a Council vote because, if adopted, they are considered effective from first filing date. Worried that development would immediately recommence once their petition was no longer active, CRGM leaders sought other means of slowing development throughout the entire GMAC study period (Pitkin 2013). In May 1998, CRGM filed another zoning petition with City Council seeking interim, citywide measures to limit large developments called Interim Planning Overlay Petition (IPOP) Review. IPOP contained similar elements to a May 1990 draft "Traffic Mitigation and Parking Supply Restrictions" ordinance developed by city transportation planner Richard Easler (Pitkin 2013) as part of efforts to replace the parking freeze, discussed in greater detail in the following chapter. In late September 1998 City Council adopted IPOP Review (Kindleberger 1998). In effect for one year, and then extended, IPOP required developers of projects of over 50,000 square feet of non-residential development to submit a traffic study for the Director of Traffic, Parking, and Transportation (TPT) to certify as "accurate and reliable." IPOP review required projects to demonstrate they would not have a "substantial adverse impact" on study area traffic using criteria of traffic generation, physical access for pedestrians and cyclists, and crash history analysis (Clippinger 2013). It also required projects to conform with city growth policies (e.g., pace of development, consistency with urban design plans, infrastructure burdens), be consistent with neighborhood character, minimize impacts on abutting neighborhoods, and provide for open space (Technology Square IPOP Permit 1999). A fiery speech from then City Councilor Kenneth Reeves criticizing fellow councilors for being afraid to vote against developers may have helped secure the Council's vote to adopt IPOP by an eight to one vote (Kindleberger 1998).

The adoption of IPOP Review released a storm of criticism from Cambridge developers and businesses. In coverage of the City Council's vote in late September, the president of the Cambridge Chamber of Commerce Gerald W. Oldach criticized "antigrowth zealots" for sending a "message that's going out worldwide" about the city's antibusiness climate. The executive director of the Cambridge Redevelopment Authority Joseph F. Tulimieri objected that IPOP's requirement that large developments have "no substantial adverse impact" was too open to interpretation that would preclude development altogether. Others opposed the time, effort, and money involved with compliance (Kindleberger 1998). The Planning Board and planning and transportation staff did not embrace IPOP initially (Kindleberger 1998; Rasmussen 2013). Until this point transportation staff did not formally and comprehensively review project traffic impacts (Clippinger 2013). Internal

resistance apparently stemmed partly from the origins of the provisions in a citizens' petition, and partly from the challenge of adjusting existing planning procedures to fulfill the requirements of the new regulation.

When IPOP review, an explicitly interim measure, eventually expired in 2011, at the recommendation of the CMAC the City Council permanently adopted IPOP's requirements for large project review as Zoning Article 19 as part of a comprehensive rezoning package (City of Cambridge 2007, 69; Pitkin 2013). Like IPOP, Article 19 requires developers of projects over 50,000 square feet to submit a traffic study and undergo "Project Review" before receiving a Project Review Special Permit from the Planning Board, which specifies the maximum number of parking spaces that can be built. When estimated traffic projections exceed traffic indicator thresholds, Article 19 also allows the Planning Board to condition the special permit on traffic mitigation measures, e.g., sidewalk improvements, bike facilities, and travel demand management measures (§19.25.11).[10] Some differences between IPOP and Article 19 frustrated residents; the traffic review study of Article 19 is "very front-loaded," meaning it is completed before the Planning Board reviews projects, and therefore is not subject to public review or participation, as it was in IPOP review (Clippinger 2013). In addition, Pitkin recalls that it was the sense among some in CRGM that the scope of traffic studies required by Article 19 was still too limited (Pitkin 2013).

The Impacts of IPOP and Article 19

Both a former resident activist, who wished to remain anonymous, and city staff have noted that neither IPOP nor Article 19 halted or even slowed development as hoped by residents (Clippinger 2013). The Planning Board's decision to grant an IPOP special permit for the 1999 expansion of Technology Square, a large property in Kendall Square, indicates the extent to which the Planning Board permitted developments that did not meet the traffic standards of IPOP Review. Despite finding that the project exceeded four out of five traffic indicator thresholds, the Planning Board stated "anticipated non conformance with its threshold criteria does not make it likely the project will have a substantial adverse traffic impact" (IPOP Technology Square 1999). Instead the Planning

[10] Other measures reflect concern for neighborhood impacts in addition to traffic. Article 19 requires projects to comply with urban design criteria such as appropriate scale (§19.31), and encourage developments to expand housing (§19.36) and open space (§19.37).

Board required Technology Square to implement traffic mitigation measures, an approach examined in greater detail in Chapter Two.

Although they have had little effect on the magnitude of development in Cambridge, IPOP and Article 19 dramatically changed the process by which city staff review the parking supply and traffic projections of large projects. Initially city staff resisted these changes but now view them positively. IPOP required developers to submit comprehensive traffic analysis for large projects. Prior to IPOP, staff at the Community Development Department did not communicate closely with Traffic, Parking, and Transportation staff on new development projects. IPOP and Article 19 forced the departments to "integrate" by requiring them to jointly review projects (Rasmussen 2013).

The case of Forest City and MIT's mixed-use development "University Park" illustrates the impact of traffic review on parking supply. In 1983 the City adopted a revitalization plan for Cambridgeport, calling for former industrial areas to be rezoned through the use of Planned Unit Development (PUD) zoning (CDD 1982, 40). Since 1970 MIT had been acquiring lands in Cambridgeport, including the former Simplex Wire and Cable Company site, and by 1982 had consolidated 27 acres of land flagged for redevelopment by the city (MIT 1982, 1). MIT selected developer Forest City to redevelop the site, called University Park into a mix of uses with significant office and laboratory space. Catherine Donaher, a consultant for MIT on the zoning and development plans for University Park, observes that the "transitional" character of the neighborhood led Forest City to argue that for project marketability the project needed ample parking. Forest City, based in Cleveland, Ohio, considered the area "seedy" and unsafe, and did not envision transit as a "defining" element of University Park. Forest City initially argued that the site should be zoned to allow two spaces of parking per 1000 square feet of development (Donaher 2013).

In late January 1998, Cambridge City Council rezoned MIT's parcels as a new mixed-use district called the Cambridgeport Revitalization Development District (CRDD), which permitted a variety of uses with the exception of heavy industry. CRDD zoning capped total development at 2.3 million square feet and imposed a 150,000 square foot limit on retail and 1.9 million square foot limit on non-residential uses (Forest City 1988) (City of Cambridge 1988). Zoning for the CRDD stipulated that parking ratios for large-scale mixed-use districts apply (see Figure 1-1) (Z.O. §15.51).

In later permit negotiations for the first two phases of the project, which included two garages, a hotel, and a number of laboratory and office buildings, Forest City received permission to construct 3200 parking spaces (a ratio of 1.4 spaces per 1,000 square feet of allowable development). Before issuing permits for the third and fourth phases of University Park, which included two additional garages, City Council adopted the terms of the IPOP petition. As a result, the remainder of the University Park project underwent IPOP Review, and the City required Forest City to submit a traffic study assessing parking usage to date. This study revealed that the property had excess parking capacity. As a result, staff recommended that the Planning Board allow less parking for the remainder of University Park. Forest City did not wish to give up any parking spaces based on their estimates of future build-out and demand. The outcome of resulting negotiations was that the final two garages at University Park were permitted so that the property could construct only 2,646 parking spaces in total, fewer than the 3,200 spaces allowed in the initial project permit. Forest City built all 2,646 spaces, now spread across three garages. Today University Park covers around 2.2 million square feet, resulting in a built parking ratio of around 1.2 spaces per 1,000 square feet (Brown 2013a).

In February 2013, Forest City received permission from the City Council for a zoning change to expand University Park by 246,000 square feet without constructing any new parking (Levy 2013), an example of the uncertainty associated with multi-year development lifecycles moderating the impacts of IPOP on parking supply. Forest City constructed all of the parking permitted at University Park before deciding that its final building would be residential instead of commercial. Because parking supply had been permitted in anticipation of a commercial building, University Park's garage was ultimately overbuilt relative to final uses (Brown 2013a). Because University Park's zoning allows parking to be pooled across the entire property (Z.O. §15.512), thus exempting it from parking proximity requirements, this excess supply can serve new development. Smaller projects elsewhere in the city may not benefit from this flexibility, indicating that permitting parking on a case-by-case basis without reference to parking supply available elsewhere means that parking supply increases proportionally with new development.

Regulating Parking Supply Through a Freeze

From the mid 1970s through the mid 1990s the City of Cambridge administered, with contested efficacy, a regulation that absolutely capped non-residential parking supply.

The Cambridge Parking Freeze was originally adopted as a regional air quality improvement measure pursuant to state efforts to meet ambient air quality standards for carbon monoxide and hydrocarbons under the 1970 Clean Air Act Amendments. The 1970 amendments authorized federal and state governments to regulate both stationary and mobile sources of air pollutants, and required EPA to establish National Ambient Air Quality Standards (NAAQS) for so called "criteria" pollutants (e.g., carbon monoxide, ozone, and nitrous oxides) with adverse impacts on human health and welfare (Altshuler 1984, 184). EPA required states with regions that could not meet NAAQS by 1975 to develop State Implementation Plans (SIPs) to reduce pollutant levels to these standards. Regions that could not achieve compliance by regulating "stationary source" emissions (e.g., power plants) alone were further obliged to prepare transportation control plan (TCP) measures. TCPs included strategies for reducing vehicle miles traveled (VMT) such as parking regulations (Altshuler 1984, 184-185).

As it worked to develop SIPs in 1972 and 1973, EPA concluded that positive inducements, such as increased transit service and carpool matching programs, would not be enough to reduce car use. The agency proposed parking fees as a TCP measure in Boston, Washington DC, Los Angeles, San Francisco, San Diego, Sacramento, and Fresno. At the time, most adopted TCPs included parking supply reductions of some kind, such as commuter parking bans (Altshuler 1984, 192). Freezes in the Boston area, New York, and Portland, all adopted in 1973, "explicitly recognize that parking supply contributes to congestion and air pollution" (Weinberger *et al.*, 2010, 23).[11]

In Massachusetts, responsibility for developing the TCP for the Boston metropolitan region to reduce carbon monoxide and hydrocarbons fell to Secretary of Transportation Alan Altshuler, who commissioned a consultant to develop a draft plan in 1972. Altshuler deemed the consultant's plan,

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[11] In 1972 the City of Portland capped downtown parking spaces at 45,000, but lifted the freeze in 1997 and replaced it with parking minimums and maximums per square foot to allow new parking space construction (23). Weinberger et al., (2010) credit Portland's freeze, along with improved automobile standards, with the city's success in attaining federal air quality standards for carbon monoxide by 1985 (54).

which would have retrofitted old cars, limited driving access to downtown Boston, imposed tolls, and instituted a state gasoline tax, to be politically infeasible. In response, he formulated a new plan which included transit investments, a state inspection program, a plan to reduce driving during periods of poor air quality, a $1 parking fee on downtown parking, and a freeze on non-residential parking supply in downtown Boston (Moore 1994, 41).

The concept of a freeze on parking initially appealed to city officials and staff in both Boston and Cambridge as a land use control mechanism. Frederick P. Salvucci, who served as transportation advisor to Boston Mayor Kevin White in the early 1970s and who negotiated with Altshuler and White over proposed TCP provisions, supported the adoption of the parking freeze. Salvucci's support originated in part from his involvement in the anti-highway movement in the late 1960s; highway opponents had argued that the car trips brought by the Inner Belt into Boston and Cambridge would not only induce land to be converted to parking but would also violate the Clean Air Act. In Cambridge, when City Manager James Sullivan learned of Altshuler's plan to freeze non-residential parking spaces in Boston, he insisted that part of Cambridge be included in the freeze area (Salvucci 2013). Cambridge City Council supported the idea of a freeze in the area of East Cambridge near the Lechmere MBTA station to protect the neighborhood from commuters who it feared would drive into Cambridge, park, and ride the Green Line downtown. (Jacobs 2013). Both Sullivan and City Council apparently feared that given its proximity to Boston and warehouses ripe for redevelopment, Lechmere and Kendall Square would be paved over with commercial lots for Boston commuters. Sullivan, who frequently feuded with Boston Mayor Kevin White, thought that Boston officials were counting on its own commuters having access to parking over the river in Cambridge when they agreed to the downtown freeze. While his views on other matters indicated support for local growth interests, Sullivan may have initially supported a parking freeze as a means of encouraging density and transit expansion in Cambridge (Salvucci 2013).

Secretary Altshuler never submitted his draft plan to the EPA,[12] however the Boston and Cambridge freezes remained components of the Boston metropolitan area TCP during

[12] The TCP that Massachusetts planned to propose relied heavily on expected federal automotive emission standards to meet NAAQS (Altshuler 1984, 192). Over time Altshuler (and officials in other states) realized that these standards would not be promulgated in time for incorporation into the plan. Rather than submit

negotiations between the EPA Region I administrator, Massachusetts Governor Francis Sargent, Altshuler, Boston Mayor Kevin White, and Salvucci in 1973 (Salvucci 2013). EPA promulgated the resulting TCP in the Federal Register in November 1973, signaling the agency's commitment to enforcing the Boston region's plan (38 FR §215, 30960-30968). The TCP included:

- A freeze on non-residential, including employee, parking in downtown Boston, Logan Airport, most of Cambridge (including all of Cambridgeport, Kendall Square, and Lechmere), and small parts of the adjacent City of Somerville;
- An on-street parking ban in the freeze area from 7am-10am;
- A requirement that entities with 50 or more employees in the Boston metropolitan area reduce employee parking spaces by 25 percent;
- A $ .25 per hour surcharge for off-street parking in downtown Boston and at Logan Airport.[13]

SIPs are not fixed documents; they comprise an evolving set of agreements (Hamel 2013). For this reason, the concept of a fixed freeze on non-residential parking has been moderated in response to opposition since its inception. The 1973 oil shock caused Congress to pass an amendment to an emergency energy bill – intended by President Nixon to relax environmental regulations—rescinding EPA's authority to impose parking surcharges or require review of plans to construct new parking facilities. Nixon ultimately vetoed the bill, but EPA took the parking provision as evidence of "firm Congressional guidance" (Moore 1994, 46). By 1975, Congress had prohibited the use of federal funds for any parking regulations (Altshuler 1979, 193).

In the Boston region, nine related lawsuits against the EPA over the TCP forced the agency to reconsider its Boston-area parking restrictions (40 FR §114, 25152). In 1974, a First Circuit Court of Appeals judge in *South Terminal Corp. vs. EPA* approved the use of a parking freeze only if EPA clarified that "residential parking spaces, free customer spaces and employee parking spaces are

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a stringent—and wildly unpopular—TCP, Altshuler decided to let EPA impose a plan so that the state could deflect criticism to the federal government (Moore 1994, 41).

[13]The rules promulgated in the Federal Register noted EPA's intent to reduce emissions by reducing vehicle miles traveled (VMT), in concert with the express policy of the Governor "to discourage continued heavy reliance on the automobile for urban core travel by encouraging increased transit usage and by other means" (38 FR §215, 30960). Governor Sargent had in 1970 rejected the Inner Belt highway proposal in favor of more funding for transit (Salvucci 2013).

exempt" from the SIP parking freezes.[14] As a result of these legal challenges, EPA worked with state and city officials to formulate a new TCP. The revised 1975 TCP no longer explicitly capped employee parking in freeze areas. While the 1973 TCP froze employee parking, defined as "any parking space reserved or provided by an employer for the exclusive use of his employees, either with or without charge" (38 FR §215, 30965), the 1975 freeze affected spaces in "commercial" parking facilities, defined as:

> "...any lot, garage, building or structure, or combination or portion thereof, on or in which motor vehicles are temporarily parked for a fee, excluding (i) a parking facility, the use of which is limited exclusively to residents (and guests of residents) of a residential building or group of buildings under common control, and (ii) parking on public streets" (40 FR §114, 25162).

Other elements of the 1975 TCP responded to Cambridge officials' concerns about the freeze rule as promulgated. Wendy Jacobs, who provided outside counsel to the City as a lawyer at Foley, Hoag, and Eliot in the late 1980s and 1990s, recalls that her own research into the origins of the freeze revealed that Cambridge City Council had failed to submit any objection to the language in EPA's original proposed parking freeze regulation which applied the freeze to the entire City rather than just portions of East Cambridge (Jacobs 2013). Although the City of Cambridge had hoped to limit the conversion of land to parking lots catering to Boston commuters, it did not want to limit parking construction throughout the city. The new TCP allowed Cambridge to add one new commercial space to the freeze bank for every two on-street residential parking spaces it converted from commuter spaces. In addition, the plan stated "In order to avoid severe economic hardships, EPA has decided to grant the request of the City of Cambridge to be allowed to issue parking stickers to employees of Cambridge businesses..." to allow them to park during the morning peak ban (40 FR §114, 25157). Figure 1-2 below shows how the TCP promulgated by EPA in November 1973 differs from the revised July 1975 rule.

[14] In a 2000 proposed rule to amend the Cambridge parking freeze (discussed in the following chapter), EPA makes clear the impact of *South Terminal Corp. vs. EPA* on revised language in the 1975 TCP (65 FR §181 56279).

Figure 1-2: 1973 and 1975 Parking Freezes in the Boston Metropolitan Area TCP

November 1973	July 1975
Freeze of non-residential, including employee, parking in the Boston core, Logan Airport, most of Cambridge, and parts of Somerville; cannot increase by more than 10% (*40 CFR Chap. 1 §52.1135*)	Freeze of "commercial parking spaces" in the Boston core, Logan Airport, and entire City of Cambridge; cannot increase by more than 10% (*40 CFR Chap. 1 §52.1135*)
No substitution rule.	Allows both Boston and Cambridge "to substitute new off-street spaces for on-street spaces physically eliminated and no longer available" (*40 CFR Chap. 1 §52.1135*)
No substitution rule.	Cambridge may "substitute new off-street spaces for one-half of the on-street spaces formerly used by non-residential commuters" and increase "the total quantity of commercial parking spaces allowable in Cambridge" (*40 CFR Chap. 1 §52.1135*)
Bans on-street parking in freeze areas during morning weekday peaks (*40 CFR Chap. 1 §52.1134*)	Bans on-street parking in freeze areas during morning weekday peaks, excluding residents of Boston and Cambridge and Cambridge employees with applicable stickers, and excluding one-hour meters (*40 CFR Chap. 1 §52.1134*)
Employers with over 50 employees across the region must reduce available employee spaces by 25 percent (*40 CFR Chap. 1 §52.1135 (a) (10) and (h)*)	Employers and educational institutions of certain sizes must adopt measures to reduce employee modeshare by 25 percent (*40 CFR Chap. 1 §52.1161*)
$.25 per hour fee on off-street parking from 7am-7pm in Boston core and Logan Airport (*40 CFR Chap. 1 §52.1136 (b)*)	Removed

Sources: 38 FR §215, 30960-30968 and 40 FR §114, 25152-25170.

Implementing 1975 TCP Parking Regulations

Although the concept of a parking freeze enjoyed initial support from high-level state officials, including Governor Sargent and Secretary of Transportation Altshuler, in practice the freezes received a more mixed review from the local officials and city staff who implemented them. After the freeze was adopted for downtown Boston, staff at the Boston Redevelopment Authority

(BRA), a public authority with broad powers to encourage and regulate development in the City of Boston, delayed proposing zoning regulations that would implement the freeze. At a freeze hearing, then state representative Barney Frank took Zoning Commission officials to task for not having implemented a policy pronouncement by the state that was so strongly supported by Mayor Kevin White. Although the BRA didn't support the freezes, staff there never mustered the political will required to replace them through a revised TCP (Salvucci 2013). Because the Cambridge parking freeze was promulgated by EPA under the federal Clean Air Act and then incorporated into the Massachusetts SIP, replacing it would require separate federal and a state rulemaking processes (Jacobs 2013).

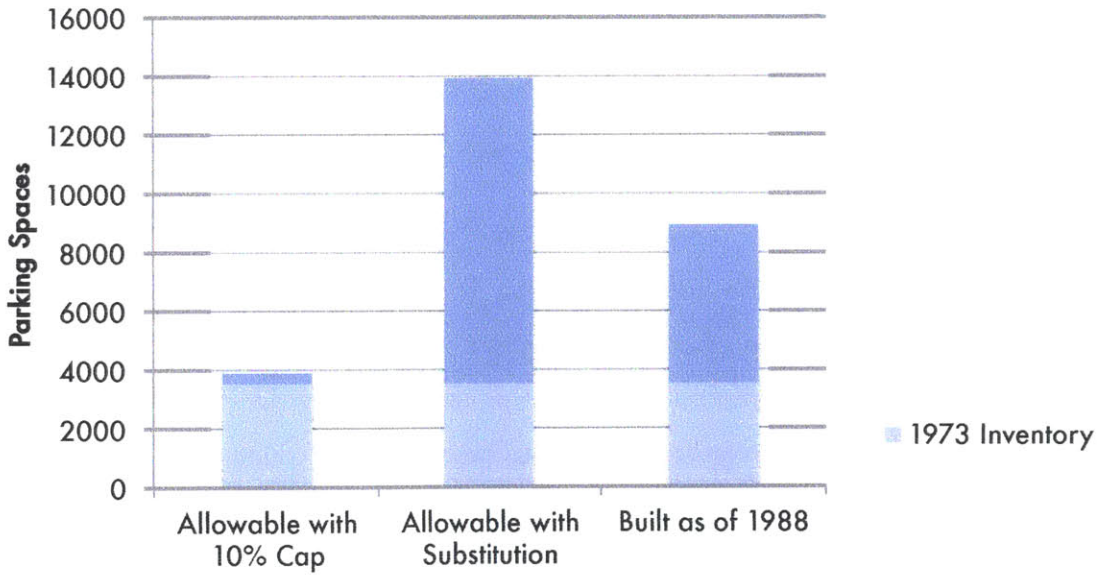
Ambiguity in the language of the 1975 rule, particularly in the definition of "commercial" parking, allowed both Cambridge and Boston to adopt interpretations of the freeze that moderated its impacts on employees and commuters. The City of Boston explicitly exempted employee spaces from the parking freeze because area businesses feared that with less parking, employees would be less willing to work in the city (Moore 1994, 54). Salvucci observes that proponents of TCP parking restrictions were aware of the sloppiness of the final regulation, but by 1975 lacked the clout to write them the way they desired. The concept of parking freezes had particular resonance during and immediately following local activism against the Inner Belt in the late 1960s but waned as time progressed. Proponents of the freeze tried to pass what elements of the freeze they could "in an environment of decreasing political will" (Salvucci 2013).

The City of Cambridge also defined "commercial" spaces to exclude employee parking. A 1984 internal memorandum of agreement between the Cambridge Community Development Department and Board of Licensing Commission regarding parking freeze criteria added two new exemptions to EPA's definition of a commercial parking space, including "(iii) parking spaces which are reserved for the exclusive use of employees, restaurant, retail store patrons or hotel guests throughout the day (24 hour period, and not available to the general public, and (iv) park-and-ride facilities." As a result of brewing legal controversy over the freeze, explored below, City staff in July 1988 wrote to EPA asking whether these exclusions were permissible (Albright 1988). In mid-October, regional counsel for EPA Region 1 and General Counsel for MassDEP issued a letter to the City approving these exemptions (Laing and Pope 1988). EPA and MassDEP accepted the City

of Cambridge's definition of commercial parking spaces in light of the *South Terminal* ruling, but only so long as no fees were charged (Savitz 1990).

The City of Cambridge took other measures to mitigate the impact of the TCP parking controls. In 1975, to protect the ability of Cambridge residents to park on city streets, Cambridge expanded its residential parking program as an alternative means of achieving the on-street morning peak-hour parking ban for commuters required by the TCP (Moore 1994, 53). For every two spaces the city placed into the residential parking program, it added one space to the commercial freeze bank. At the time of the freeze, there were 3452 commercial spaces in Cambridge, which would have allowed the city to increase commercial parking by 345 spaces. However, the city noted that by converting 17,414 on-street spaces to resident-use only, it could add 8,707 spaces to the commercial bank, and by eliminating access to 1685 more on-street spaces, it could add a total of 10,392 spaces to the freeze bank. Between 1973 and the end of June 1988, the city permitted the construction of 7,699 new commercial spaces, and registered the elimination of 2,308 existing spaces, resulting in a net increase of 5391 commercial parking spaces (see Figure 1-3) (Teso 1988).

Figure 1-3: Allowable and Built Commercial Parking Spaces, 1988



State officials never intended for the City's plan of converting on-street commuter spaces to residential spaces to supersede the 10 percent cap (Hamel 2013). The city's approach was predicated on language in the TCP stating that when converting commuter to residential spaces,

"the total quantity of commercial parking spaces allowable in Cambridge under this section shall be raised accordingly" (40 FR §114, 25163). Cambridge took this as permission to supersede the provision in EPA's rule that allowed freeze bank increases only if they did *"not result in an increase of more than 10 percent in the total commercial parking spaces available for use on October 15, 1973."* Language in a later section supports the position that the 10 percent cap prevails: [15]

> "'Freeze" means to maintain at all times after October 15, 1973, the total quantity of commercial parking spaces available for use at the same amounts as were available for use prior to said date; provided that such quantity may be increased by spaces the construction of which commenced prior to October 15, 1973, or as specifically permitted by paragraphs...(n) [Cambridge resident permit] ... provided further that such additional spaces do not result in an increase of more than 10 percent in the total commercial parking spaces available for use... in any municipality within the freeze area."

The city would later defend its actions publicly by saying that before the 1975 rule went into effect, state and federal governments had negotiated an exemption for Cambridge from parking freeze provisions. The city argued that because the City originally intended for the freeze to apply only to a subsection of the city, for voluntarily placing the entire city under the freeze, the act was amended to allow Cambridge to add one commercial parking space for every two eliminated from the street (Mann 1989). It is not clear what function a fractional parking space conversion rule would serve absent an allowance for Cambridge parking freeze bank expansion (i.e., if the bank could not grow, a fractional conversion rate only moderates how quickly a freeze cap can be reached).

Ultimately, rules permitting the city to convert commuter to residential spaces and increase the freeze bank accordingly weakened the potential for the TCP to alleviate commuter traffic. The 1975 TCP allowed for the conversion of on-street spaces in disparate parts of the city to support parking space construction in the neighborhoods experiencing the most growth. Another aspect of the 1975 amendment allows Cambridge employees to park on-street during the morning rush hour ban (40 FR §114, 25162). Because the TCP did not prohibit Cambridge employees from receiving passes allowing them to park in on-street resident-only spaces,[16] there was no hard cap

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[15] This language appears on page 25162 of 40 FR §114, and refers to 40 CMR Chap. 1 §52.1135 (a) (6)).

[16] The 1975 TCP rule for 40 CFR Chap. 1 §52.1134 (a) defined "on-street" parking as "parking a motor vehicle on any street," while (c) notes that the following classes of vehicles were exempt from the on-street ban: "Vehicles owned by residents of Cambridge that are registered in and parked within Cambridge and

on commuter parking other than competition between residents and commuters for on-street spaces.

Limited Growth Advocates Challenge Development With the Freeze

The lack of clarity surround the definitions and requirements of the freeze came to a head in late October 1988 when a residents organization called Cambridge Citizens for Livable Neighborhoods (CCLN) filed a lawsuit against the Cambridge Director of Traffic and Parking for failing to properly administer the city's parking freeze. The main contention of the lawsuit was that the city had been illegally excluding employee parking used for a fee from the 1975 freeze (Miyares 2013). In suing the city, CCLN's primary motivation was to protest the development of a 1,530-space parking garage under construction on Binney Street at a development called One Kendall Square. The suit alleged that because of the City's oversight, the developer of the garage, the Athenaeum Group, began construction with an illegal exemption from the freeze (Miyares 2013). Between 1973 and 1988, the City had issued permits for 5391 net new commercial spaces, and exemptions from the freeze to 5,162 new non-residential parking spaces (Teso 1988).

By their own accounts, members of CCLN were motivated to sue the city because they saw the freeze as a tool to advance their interests as limited growth advocates. The group hoped to slow, if not halt, the rapid densification and development of Cambridge in favor of more "thoughtful" development (McManus 2013) (Geer 2013). Some of CCLN's members at the time called the crane the official bird of Cambridge."It seemed like everywhere you looked there was a huge building going up," says Daniel E. Geer, one of the group's founders. CCLN's members were particularly troubled by the actions of the Cambridge Redevelopment Authority (CRA), which has powers to acquire property by eminent domain, relocate families, and otherwise undertake redevelopment. From 1965 through the 1990s, the CRA implemented the Kendall Square Urban Renewal Plan, which focused on lands north of Main Street, below Binney Street and to the east of the Grand Junction railroad. The CRA's goals were to acquire and consolidate parcels, distribute

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display an appropriate parking sticker issued by the City of Cambridge." Provision (f) notes that "the Director of Traffic and Parking... may issue special parking stickers to such employees which shall entitle vehicles to park during the hours of the ban. Such stickers shall be valid only for those streets and areas of streets clearly identified on the face of such stickers, shall be issued with preference being given to carpools and vanpools..."(40 FR §114, 25162).

land to developers, and grant special permits to encourage redevelopment of the area's former industrial lands (Kendall Square Urban Renewal Plan 1965). CCLN was concerned that Cambridge's strategy of encouraging large-scale development projects would ultimately decrease neighborhood livability for residents (McManus 2013). Members were also worried that development would further motivate the elimination of rent control, the most intensely debated local political issue at the time (Geer 2013). Residents who advocated for limited development generally favored rent control as two elements of a vision of a neighborhood-scale and family-oriented city.[17]

CCLN seized upon enforcement of the parking freeze only after East Cambridge resident Debra McManus brought the regulation's existence to their attention. McManus lived next to One Kendall Square in East Cambridge, and had first learned about the garage on the day that construction began, right up to her property line. Soon after, McManus heard about the Cambridge parking freeze from another concerned neighbor. A candidate for Cambridge City Council, Ed Cyr, accompanied McManus to speak with City Manager Robert Healy, who replaced Sullivan in 1981. McManus recalls that at their meeting, Healy looked "pained" at the realization that "the cat's out of the bag." At this point Cyr and others realized that the freeze could be a tool for CCLN to oppose development across the entire city (McManus 2013).[18]

CCLN membership drew from the leadership of every Cambridge neighborhood association. These organizations had all separately fought—and lost—"battles" with the city over development and sought strength from unity (Geer 2013). The group benefited in particular from the expertise

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[17] Indeed, by limiting the ability of landlords to charge more money of more tenants, rent control was listed as a viable means of limiting density by the US Supreme Court in its famous 1974 decision *Village of Belle Terre vs. Boraas*. In the same case the court also suggested that limits on the number of vehicles per household would be a constitutionally acceptable means of limiting residential density.

[18] The tactics used by the principals of the Athenaeum Group, Bob Jones and David Clem, to quiet CCLN's opposition only increased resident resolve to fight the garage through the freeze. McManus remembers that Jones himself knocked on her door in East Cambridge one day and offered to send her and her family on an all-expenses paid vacation any where in the world. When she refused, he told her that if she didn't halt her opposition, the Athenaeum Group would sue her and take her house (McManus 2013). After CCLN did indeed sue the Athenaeum Group for beginning construction on the garage without proper permits, the developers made good on their promise in a counterclaim. Geer and McManus call the Athenaeum Group's counterclaim against CCLN a SLAPP suit (strategic lawsuit against public participation), designed to drain CCLN's resources and resolve, although it did not achieve its purpose. The suit was eventually dismissed, but not before several CCLN members were deposed (Geer 2013).

brought by members of the Harvard Square Defense Fund (McManus 2013), which since 1979 had confronted the City and developers over changes in Harvard Square they feared would usher in chain stores and harm area environmental health (Luo 1995). Many CCLN group members were well-educated and connected, and "knew how to find money." With their help, CCLN raised enough funds to hire environmental lawyer Raymond J. Miyares (McManus 2013).

McManus recalls Miyares advising that the way to get the city's attention over the Athenaeum Group's One Binney Street garage was through a lawsuit (McManus 2013). The core legal argument in the 1988 suit brought by residents against the city was that the definition of "commercial parking facility" in the 1975 freeze should not have legally excluded employee parking available for a fee, regardless of whether a fee was paid monthly (*McManus vs. Teso*). The plaintiffs brought their claims under Chapter 214 §7 (a) of the Massachusetts General Laws, which allows citizens to allege damages to the environment. CCLN argued that building a parking garage in violation of the parking freeze constituted environmental damages (Miyares 2013).

In November 1989, CCLN filed another lawsuit against the state and federal governments, as well as the city, for violations of the Clean Air Act (Mann 1989). This suit, *Geer et al., vs. Commonwealth of Massachusetts et al.*, questioned the legality under the SIP of expanding the Cambridge freeze by half of all spaces converted from general on-street parking to residential on-street parking (Mann 1989).

By the time CCLN filed its first lawsuit in 1988, there was ambivalence among federal officials toward the freeze. The docket of court records for *McManus vs. Teso* contains an internal EPA memo, dated November 10, 1977, stating the opinion of Region I Assistant Regional Council Harley F. Laing that EPA could not enforce the freezes because §110(a)(5)(A) of the 1977 Clean Air Act Amendments "prohibits EPA from promulgating an implementation plan which includes a program of regulation of parking lots, parking garages and similar facilities." The letter notes that while amendments did not "clearly prohibit EPA enforcement of an off-street parking regulation, like the Boston freeze...such enforcement would seem to be inconsistent with the apparent purpose of the amendment which is to limit EPA's role in this arena to federally assisted, owned or operated facilities." The memo notes however that unless the regulations were to be withdrawn,

they were still enforceable by state and local authorities (Laing 1977). The difficulties of implementing the freezes impacted how EPA viewed the their effectiveness. A letter from CCLN to Laing dated December 9, 1988 summarized for the record points from a meeting between CCLN leaders and EPA; they included paraphrased statements from EPA staff noting that the ambiguity of the final 1975 rule made the freeze difficult to interpret and therefore administer. EPA staff suggested in that meeting that the freeze had influenced parking garage location and fee collection methods more than it had vehicle trips. By defining "commercial" in terms of parking payment, garages had adopted alternative methods of payment to avoid daily fees and therefore be exempt from the freeze (CCLN 1988).

State authorities were not monitoring freeze implementation in Cambridge prior to the 1988 lawsuit. Another letter, dated October 25, 1988, in the *McManus vs. Teso* file from EPA to the City of Cambridge states that the city had submitted neither an initial parking inventory, counting all commercial spaces that existed in 1973 (a condition required for the authority to implement the freeze), nor a single annual report on freeze implementation (Laing and Pope 1988). It was not until 1990 that the Massachusetts Department of Environmental Protection (MassDEP) and EPA completed an audit of freeze implementation in Cambridge (Gitto 1990). The audit indicated that while the City had kept a "reasonable" inventory of the commercial spaces that existed prior to 1973, and which it permitted subsequently, it lacked a monitoring or enforcement program. The audit found that "virtually all the exempt and mixed facilities charged fees for exempt spaces" (defining "mixed" facilities as those with spaces available to the public for a fee as well as spaces restricted for the use of employees or residents). From this audit the state and EPA determined that in practice, the definition of commercial parking space used by the City was not consistent with the SIP (US EPA and MassDEP 1990).

Pipeline Projects

On November 10, 1988 the City, EPA, and DEP reached an initial agreement in which the City agreed to halt the issuance of new permits (Kozinets 1988). During subsequent negotiations it it became clear to state officials that any future agreement would need to address City Manager Healy's concern about the freeze's impacts on "pipeline" projects: those approved by the Planning Board but lacking commercial parking permits, namely the Cambridgeside Galleria Mall and Forest

City's University Park (Kwetz 1990). The "linchpin of this whole mess," as one state official wrote to colleagues, was the Galleria (Deese 1989). Residents have speculated that Healy faced enormous pressure to limit commercial parking at the Galleria from developer Tommy O'Neill. A former Massachusetts Lieutenant Governor and son of Tip O'Neill, Tommy O'Neill was developing the mall in an effort to revitalize the Lechmere area of East Cambridge. When CCLN's lawsuits broke, construction on the mall was nearing completion but the city hadn't yet issued commercial parking permits (McManus 2013).

MassDEP e-mails later made public during a subsequent court case (*Jones vs. Teso*, discussed below) revealed that state officials intended to use the City's eagerness to grandfather parking at the Galleria as a means of securing commitment from Cambridge both to pursue enforcement for non-compliant facilities and to also develop a new SIP amendment that the City of Cambridge would actually enforce (Spencer 1990). These e-mails suggest that state officials felt caught between Cambridge's insistence regarding grandfathering parking for the Galleria on one side and the eagerness of EPA and the Conservation Law Foundation, a prominent legal action group that had by then entered the fray, for the state to strengthen Cambridge's commitment to the Clean Air Act (Deese 1989,1990).

Eventually state officials resolved the Galleria dilemma, as well as *Geer vs. Commonwealth*, in in an August 1990 Memorandum of Agreement between City Manager Healy and the Commissioner of MassDEP Daniel Greenbaum. The MOA noted that the parties "have agreed to cooperate in an effort to amend the State Implementation Plan (SIP) required by the Clean Air Act," and noted that the final SIP amendment "will include measures including but not limited to parking restrictions, and a parking freeze" (City of Cambridge and MassDEP 1990).

The MOA officially reinforced the status quo by grandfathering spaces granted in violation of the freeze. It did this first by establishing that the City could, during the "interim" period before a new SIP was adopted, issue permits for 500 "controlled parking facility," spaces in addition to the parking spaces that existed as of November 10, 1988, the date of the initial agreement between the City and the Commonwealth that halted issuance of parking permits. It also allowed spaces to be added to the bank equal to the number taken out of use through enforcement action. Because the size of the freeze bank thus hinged on the number of spaces eliminated for enforcement, the

MOA did not affix the size of the freeze bank to a particular number. It did however include as an addendum to the MOA a list of 11 garages requiring enforcement (City of Cambridge and MassDEP 1990). In a letter to Andrew Savitz, General Council for the state Executive Office of Environmental Affairs, representative of Cambridge Citizens for Livable Neighborhoods Ray Miyares criticized this approach, noting that both EPA and the state placed the size of Cambridge's freeze bank "debt" at around 8500 spaces. Miyares contented, "The MOU does not reflect the actual experience of the City in implementing the Parking Freeze" (Miyares 1990).

Minimizing the impact of the freeze on past and future development was of utmost importance to City Manager Healy. A July 1990 letter from Savitz describing the anticipated MOA to Governor Dukakis and Secretary of the Environment John DeVillars noted that in negotiations Healy had "been assiduous in preserving flexibility under the Agreement for economic development." The MOA was acceptable to Healy only because of a separate agreement between the developers of the Galleria, City, and Conservation Law Foundation, which allowed for the Galleria's permits, but no other pipeline project's, to be grandfathered (Savitz 1990).

The 1990 Parking Freeze

In November 1990, the Cambridge City Council adopted a parking ordinance(§10.16) as required by the August 1990 MOA. The preamble contains language noting the symbolic importance of the freeze to state officials: "enforcement of a parking freeze will demonstrate the commitment of the City to support the Clean Air Act by discouraging automobile traffic to the City." The ordinance made a number of important changes to freeze procedures. It required any person building a parking facility in Cambridge to obtain either a "controlled" parking facility permit or a determination of exemption. The ordinance defined "controlled" parking as spaces in "any lot, garage, building or structure... on or in which motor vehicles are parked, *except* (i) a parking facility, the use of which is limited exclusively for the benefit of the residents of a specific residential building... (ii) parking on public streets, and (iii) a parking facility designated as a park-and-ride facility" (City of Cambridge Ordinance No. 1112, 1990).

The ordinance established that the City could issue permits for up to 500 controlled parking spaces, in addition to the number of parking spaces the City had eliminated through enforcement

and in addition to "the number of commercial parking spaces permitted in accordance with the November 15, 1984 MOA and are no longer being used." This indicates that the total freeze bank would have included at minimum 9,202 spaces (3,540 spaces from the initial 1973 inventory, plus the 5,162 spaces granted through June 1988 plus the 500 space cushion), plus any spaces the city eliminated through enforcement.

The ordinance placed no limits on the number of "determinations of exclusion" the City could issue, and offers no specific guidance in the ordinance as to what constituted an exclusion, defining it only as "a determination by the Director of the Cambridge Department of Traffic and Parking that a parking facility does not come within the definition of a controlled parking facility" (City of Cambridge Ordinance No. 1112, 1990).

The Ordinance also established that an Interim Parking Control Committee (IPCC), appointed by Healy, would review applications for commercial parking spaces as well as exemptions from the freeze. In late 1990 Healy appointed a three-person IPCC to allocate spaces under the parking freeze. One of its members was CCLN's Debra McManus. In December 1990 the committee made its first decision, approving a petition for 860 parking spaces for a phase of Forest City and MIT's development at University Park. McManus cast the only vote against the request, noting at the time that the other board members based their decision on the expansion of the freeze bank through the closing of temporary parking facilities near Lechmere and at MIT. McManus believed that the temporary nature of those facilities meant that their spaces could not be rolled back into the freeze bank. The IPCC's decision was particularly controversial because the chairman of the committee at the time was an MIT campus policeman, causing City Council to ask City Manager Healy to investigate possible conflict of interest. None was determined (Rosenberg 1991).

McManus calls the IPCC "an absolute joke," noting that in the two years she served on it before resigning, the committee never voted to reject developers' applications for parking (2013). A list of IPCC decisions from December 1990 through 1996 records no instances of the IPCC rejecting any applications; only decisions permitting 1648 controlled parking permits and granting determinations of exclusion for 5852 employee, customer, and visitor parking spaces. Next to determinations of exclusion for employee parking spaces in the inventory is written, under the heading of "type" of space the term "1984 MOA" (City of Cambridge 1997). This suggests the employee spaces were

determined to be exempt according to the procedures defined by the 1984 internal memorandum of agreement, which granted a specific exclusion for spaces reserved exclusively for employees.

Despite efforts to accommodate new parking, the City's subsequent actions to enforce the 1990 parking freeze ordinance nonetheless angered developers, evidence of the pressure facing City officials regarding the freeze. In late 1990 the Atheneum Group, developers of One Kendall Square, filed a lawsuit against the City (*Jones vs. Teso*) alleging unfair treatment of the group's application for parking permits. The plaintiffs claimed that the City had improperly granted Forest City permits for commercial spaces at University Park while denying permits for the Athenaeum Group, despite the Athenaeum Group's application for permits prior to Forest City's. In 1992, a state judge ordered the City of Cambridge to review the Athenaeum Group's application for permits. In his opinion, Judge Owen Todd wrote, "The facts the plaintiffs allege in support of their accusation describe a numbing and depressing tale of political machinations" (Todd 1992).

The 1990 parking freeze ordinance would eventually be rewritten in 1997 as part of city efforts to replace the freeze with measures targeting demand for parking and driving. The following chapter examines these efforts.

CHAPTER 2 – RECASTING THE FREEZE

In the early 1990s, city staff began developing a SIP amendment that would both demonstrate the City's commitment to the Clean Air Act and replace the Cambridge parking freeze, at that time implemented as a 1990 Ordinance §10.16 concerning "controlled" parking spaces. In its effort to convince EPA and the Commonwealth to remove the parking freeze from the state SIP, Cambridge developed what became known as the Vehicle Trip Reduction Program (VTRP). A 1992 city ordinance formed the basis for the VTRP by committing the city to adopt measures reducing demand for driving, especially employee driving. As part of the VTRP the City adopted the 1998 Parking and Transportation Demand (PTDM) Ordinance, which requires projects proposing to add parking to implement a travel demand plan. The PTDM Ordinance, combined with Article 19 Project Review, discussed in Chapter One, greatly increased city capacity to condition new parking supply on travel demand measures. In spite of the City's emphasis on reducing demand instead of restricting supply, new travel demand management requirements elicited many of the same concerns about lost regional competitiveness, as had the freeze. The PTDM Ordinance thus embraces a flexible approach to employer travel demand management. This chapter explores the evolution of Cambridge parking policies from the freeze to demand-side programs.

Growth Coalition Opposition to the 1990 Freeze Ordinance

In Cambridge, the reaffirmation of the parking freeze through the August 1990 MOA ran counter to the local growth coalition's idea of a good business climate. Following the August 1990 MOA between City Manager Healy and the Commissioner of DEP, Cambridge staff and officials began to draft a new SIP amendment, as required, that would be palatable to its business community as well as acceptable to state and federal officials as a SIP amendment. Even though the agreement grandfathered existing parking spaces, Cambridge business community members were upset that the City's 1990 agreement with the state capped freeze bank expansion to 500 spaces and targeted non-compliant parking garages. During a protest with fellow developers outside the council chamber during freeze deliberations, Chamber of Commerce leader David Vickery commented,

"In this economic climate, a parking freeze sends the wrong message at the wrong time. The present freeze is a very simplistic approach. This group is not opposed to clean air or traffic mitigation programs" (Barnes 1990a). Vickery, who at the time was developing a large project near Alewife Station, and others, including Harvard University, advocated amending the freeze to explicitly exclude both employee and student parking (Barnes 1990b). Former CCLN member Dan Geer estimates that many councilors were sympathetic to arguments for replacing the freeze because they wanted to ensure there would be enough available parking for projects in their neighborhoods. A strong parking freeze threatened to make development not just a neighborhood issue, but a city-wide issue if parking spaces were to be drawn from a truly limited pool (Geer 2013).

Critics of the parking freeze conceived of any potential limit on development as a threat to the Cambridge commercial tax base. Officials argued at the time that the city was expensive to run given its relatively high proportions of low-income residents and high constituent demand for services (Hamel 2013) (Geer 2013). In addition, twenty-five percent of city's land is tax exempt, a third of this belonging to private academic institutions (City of Cambridge 2012). In the early 1990s, two-thirds of the city's property tax income came from the commercial taxes (Nawaday 1992). In 1990, MIT paid less than $770,000 in payments to Cambridge. While Harvard was first nonprofit in the United States to make voluntary payments in lieu of taxes in 1929, by 1990, the University paid only around $1 million in fees. In that year, city officials estimated that the University's tax-exempt property was worth around $71 million in taxes (*New York Times* 1990).

In Massachusetts, further incentive for local governments to increase property values through development derives from two particular laws. First, compared with municipal governments in other states, Massachusetts's cities and towns rely heavily on the property tax because municipal governments cannot raise revenue through sales or income tax. Second, since 1980 Proposition 2½ has meant that a local government's property tax levy, or revenue, cannot exceed 2.5 percent of the full value of all taxable property, and that total tax levy cannot increase by more than 2.5 percent from the rate the year before. Proposition 2½ exempts new development from the previous year's levy limit (MA Department of Revenue).

In the early 1990s the Boston area experienced a real estate recession, and in 1992 the Cambridge City Council explicitly rebranded itself "pro-business" in an attempt to keep jobs and tax revenue in the city. In late 1991, Cambridge biotechnology company Genzyme "spurned" the city by choosing to build a new $75 million headquarters in Allston.[19] This, as well as concern for growing office space vacancies elsewhere in Cambridge, motivated City Council to "bury Cambridge's reputation as an anti-business town," as newly appointed Mayor Ken Reeves vowed to do in his inaugural address. That year, Cambridge would need to secure new revenue to build a new hospital and new schools; the city's finance director commented at the time, "There's only one way to pay for all that: a strong tax base." The new council's efforts spoke to its commitment, and the council adopted policies to rezone Cambridgeport to encourage light industry, develop a local employment plan, use bond financing for companies through the Cambridge Industrial Financial Authority, and consider tax exemptions for companies. As part of this effort, the City Manager's office had already begun redrafting Cambridge's parking freeze so that it would no longer limit allowable development through limits on parking spaces (Nawaday 1992).

Vehicle Trip Reduction Ordinance

Soon after the August 1990 MOA with DEP, city staff and outside consultants began developing a SIP amendment proposal to replace the freeze. The result was the Vehicle Trip Reduction Ordinance (VTRO), passed in 1992. The VTRO committed the city to adopting rule and program expansions largely designed to increase city capacity to plan for physical enhancements and encourage alternative modes. It does not regulate development or employer behavior directly. For example, the VTRO directed the city to examine its zoning ordinance and consider reducing minimum parking requirements and imposing additional maximums in the zoning ordinance (§10.17.080), expand the commuter mobility program (§10.17.040) hire a bike and pedestrian coordinator within the Traffic and Parking Department (§10.17.050), improve coordination with the MBTA (§10.17.090), and conduct a pilot survey of employers to set a baseline for commuting patterns in order to design additional measures to achieve the goals of the Clean Air Act (§10.17.130).

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[19] When Genzyme chose to locate in Boston, some recall that City Manager Healy asked the company's CEO to blame the Cambridge parking freeze (Salvucci 2013).

The text of the Vehicle Trip Reduction Ordinance explicitly positions the regulation as a reaction against the parking freeze. The ordinance begins by describing the city as a locality struggling against metropolitan forces to reduce traffic and congestion, noting that a large portion of Cambridge vehicle traffic arises from "through trips" over which the City has virtually no control. The ordinance for this reason calls on the Massachusetts Department of Environmental Protection (MassDEP) to amend its SIP to include measures that apply across the state, including an employer-based vehicle trip reduction program. It also called for the Commonwealth to revise state tax policies regarding employer parking subsidies, and support the Urban Ring transit project (10.17.160).[20]

This language reflects from debate within Cambridge City Council over whether trip reduction measures would "place Cambridge employers and businesses at a competitive disadvantage in relation to those in other communities or to subject Cambridge residents to inconveniences not yet being imposed on residents of other communities" (Jacobs 1992). Wendy Jacobs, a lawyer at law firm Foley, Hoag, and Eliot hired by the city to develop the new SIP amendment, observed in a May 1992 letter to Healy, prior to City Council passage of the VTR Ordinance, that provisions preserving city flexibility in case the freeze was not replaced were prudent because it was possible "given the history of litigation surrounding the parking freeze in Cambridge and the Conservation Law Foundation's ongoing efforts to link the Cambridge parking freeze to the Central Artery project, the state may seek to minimize further litigation on the issue by taking no action to lift the Cambridge parking freeze or by otherwise incorporating some form of a parking freeze in its future SIP revisions" (Jacobs 1992).

As a result the Council adopted measures to mitigate concern that its commitments to parking management and vehicle trip reduction would place the city at comparative disadvantage (Jacobs 1992). A sunset clause allows the city to end any and all provisions of the VTRO should EPA adopt transportation control measures, including the parking supply management measures, which "do not have an equal impact on the Region." (§10.17.230). A number of policies would enter

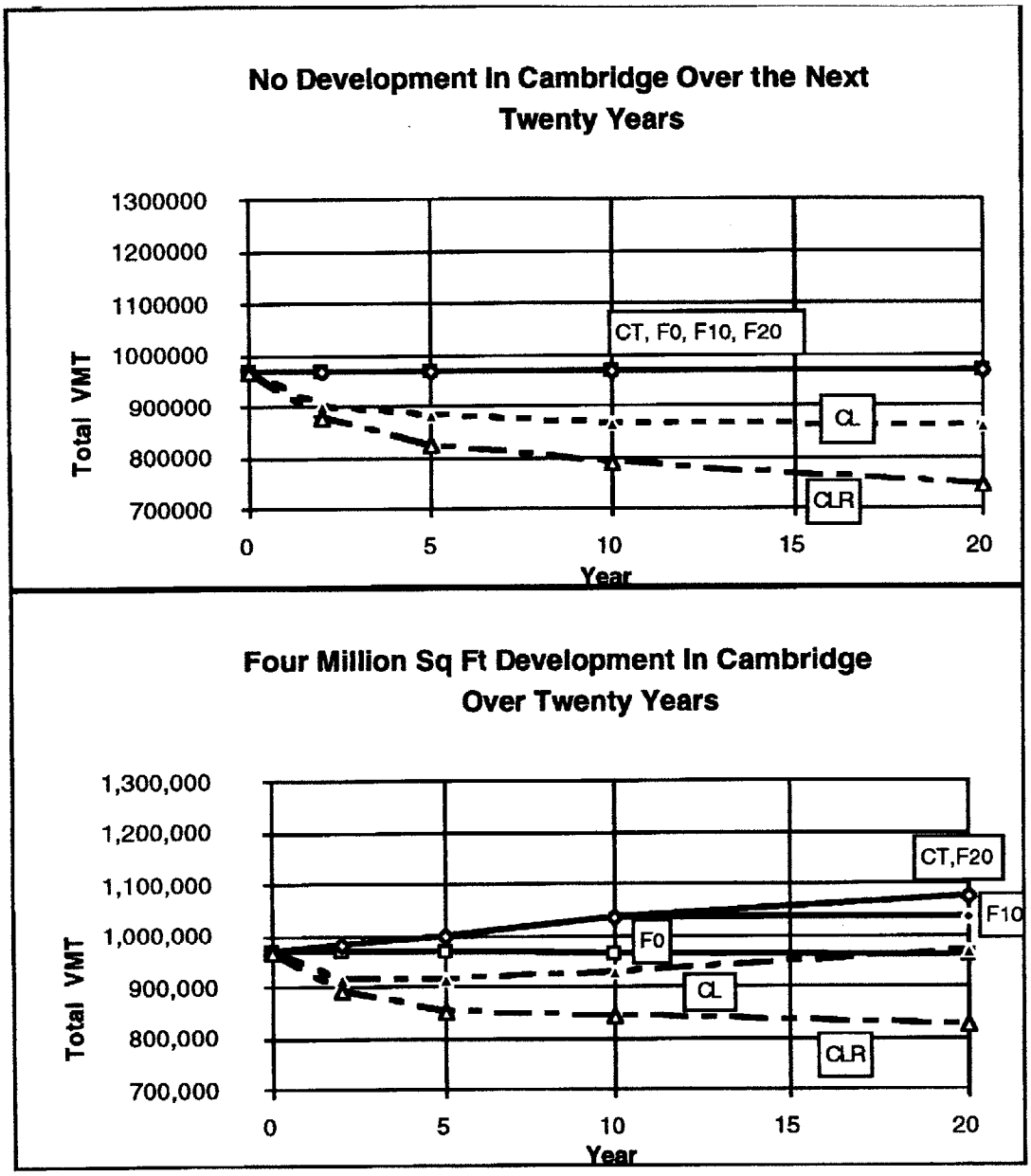
[20] The Urban Ring is a bus transit project that has been under consideration by MassDOT and Boston area communities for decades as a means of connecting Cambridge and other communities into Boston. An estimated 13,000 riders would be expected to board the Urban Ring at Kendall Square alone (City of Cambridge 2013). The project has stalled in recent years (MassDOT 2013).

into effect only if both the freeze were replaced and if a statewide VMT reduction program were adopted by the state. These provisions include the expansion of the mobility program, the promotion of "clean" fuels such as methanol and CNG, and restrictions of on-street public parking supply (through new meters, residential-only spaces, and parking prohibitions) (§10.17.190; §10.17.200; §10.17.210).

Modeling the Proposed SIP Amendment

Because EPA would only accept a new SIP amendment with extensive supportive documentation of its proposed benefits, by January 1991 the City had hired transportation consultancy Cambridge Systematics, Inc. to compare the effects of the proposed SIP amendment, comprising the new ordinance and all associated policies, to those of the city's parking freeze (CSI 1991). The company's analysis suggested that the proposed SIP amendment would have "immediate real reductions" in VMT, but that freeze conditions would achieve superior reductions in conditions of significant development over the long term. These projections are below:

Figure 2–1a: Cambridge Systematics' Comparison of the Parking Freeze and VTRP



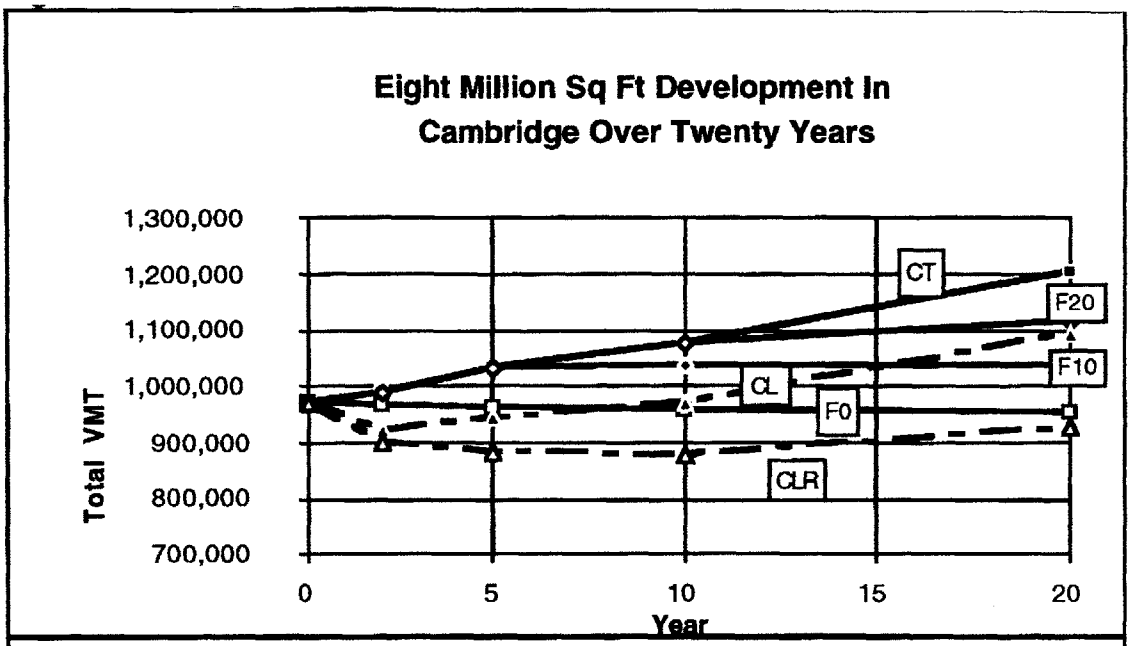
Options Assessed:

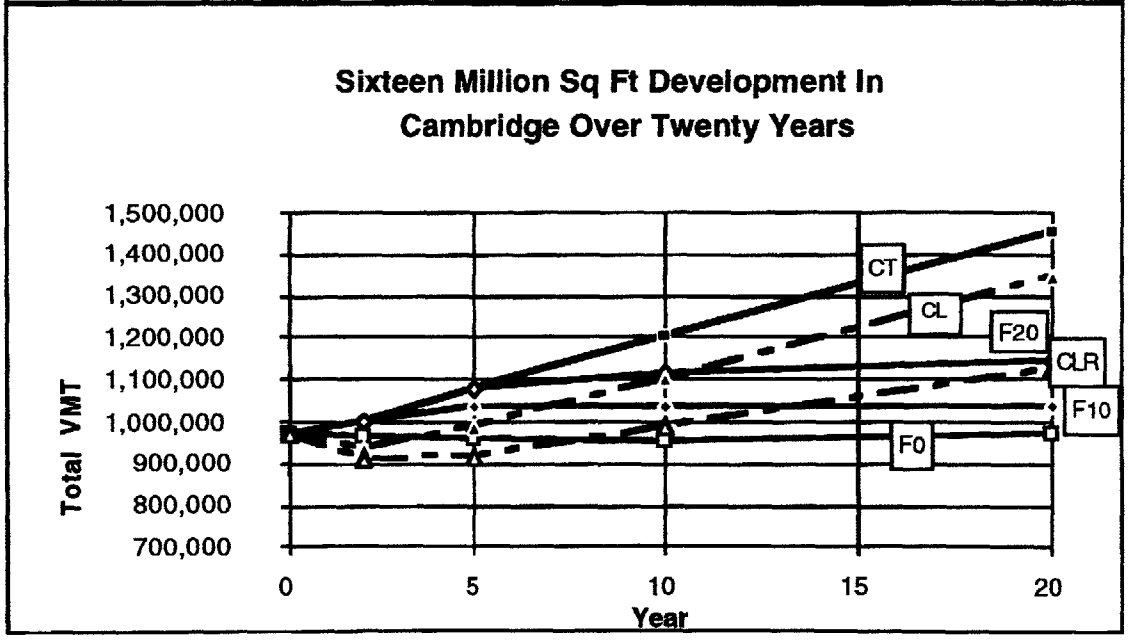
CT	Current Trends
F0	Freeze at 1990 Inventory
F10	Freeze at 1990 Inventory plus 10%
F20	Freeze at Year 1990 Inventory plus 20%
CL	Cambridge Six Local Measures SIP Amendment
CLR	Cambridge Six Local Plus regional Employer Trip Reduction Measures of SIP Amendment

Source: Cambridge Systematics, "Cambridge Proposed SIP Amendment, Technical Appendix", September 1992

(formatting courtesy of Moore 1994)

Figure 2–1b: Cambridge Systematics' Comparison of the Parking Freeze and VTRP





Options Assessed:

CT	Current Trends
F0	Freeze at 1990 Inventory
F10	Freeze at 1990 Inventory plus 10%
F20	Freeze at Year 1990 Inventory plus 20%
CL	Cambridge Six Local Measures SIP Amendment
CLR	Cambridge Six Local Plus regional Employer Trip Reduction Measures of SIP Amendment

Source: Cambridge Systematics, "Cambridge Proposed SIP Amendment, Technical Appendix", September 1992

(formatting courtesy of Moore 1994)

The analysis presented by Cambridge Systematics Inc., (CSI) in a 1992 technical appendix to the City of Cambridge's proposed SIP amendment embodies both the technical and political elements of debate over the impacts of parking supply restrictions versus commuter demand policies. Projections of future VMT hinged heavily on projections of future development in Cambridge. CSI's report stated that, absent substantial future development, a parking freeze wouldn't achieve "any" air quality benefits. Under a no growth scenario, or "in the short term," the company projected that demand-side programs were superior. In the long term and under a high growth scenario (16 million square feet over twenty years), CSI found the freeze to achieve far superior reductions. Cambridge Systematics' analysis for how the freeze would impact VMT in the future was essentially a cap; their model projected constant VMT for the current freeze under all development scenarios (CSI 1992). CSI's conclusions also referenced concern that parking constraint would VMT elsewhere in the region (CSI 1992), and the model assumed that trips would be "diverted" away from the city (Lawton 1992). Both supporters and opponents of the freeze could find material to support their arguments in CSI's work. Supporters of the freeze could argue that in the long term the freeze would be vastly more effective in reducing VMT and air pollutants. Opponents of the freeze could argue both that significant growth was not expected, and that under a growth scenario the freeze would cause businesses to relocate elsewhere in the region.

In September 1992 the city submitted Cambridge Systematics' analysis of the Vehicle Trip Reduction Ordinance and associated measures, called the Vehicle Trip Reduction Program (VTRP), to Mass DEP as a proposed SIP amendment, and argued that these policies should replace the commercial parking freeze (Moore 1994, 69). In its Technical Appendix Cambridge Systematics stated that significant growth in Cambridge was unlikely, calling development in the 1980s unprecedented. CSI noted that estimating build out of 8 million square feet over twenty years was "worst-case scenario in terms of VMT growth" (CSI 1992, 5-3). In the twenty years since CSI's analysis, Cambridge development has increased by 15 million square feet (City of Cambridge 2011b).

Concerns about fairness and lost competitive advantage underlie the City's interpretation of the technical merits of the freeze; under a scenario of no growth, the freeze would not reduce VMT, however the freeze in the context of growth was clearly of greatest concern. Sonia Hamel, who negotiated with Jacobs and the city on behalf of the state Executive Office of Environmental Affairs

(EOEA) over the City's proposed SIP amendment in the mid 1990s, recalls that City Manager Healy was convinced that the freeze would only drive more life sciences and technology employers to settle near Massachusetts Route 128, in a high-tech cluster that boomed in the 1980s. Healy at the time argued that the most environmentally responsible course of action was to incentivize companies to settle in Cambridge instead of along Route 128 (Hamel 2013).

Cambridge Systematics and the state differed greatly in their assessment of how likely the freeze was to drive trips out of Cambridge to elsewhere in the region. Modeling done by Central Transportation Planning Staff (CTPS) led state staff to consider the freeze superior to Cambridge's proposed amendment in large part because they had different assumptions about company relocation. CTPS and EOEA staff argued that CSI had overestimated employer relocation out of Cambridge due to the freeze, and that the likelihood of relocation depended on how the freeze was implemented. Hamel notes that she and others urged the City to use the freeze to incentivize or even mandate shared parking. She also encouraged City staff to deflect criticism of the freeze to the state, convinced that developers would want to be in Cambridge enough to rise to the occasion and find ways to live with the regulation (Hamel 2013).

The CTPS model nonetheless may have overestimated the impacts of the freeze by virtue of assuming that the August 1990 MOA between the City of Cambridge and MassDEP meant that "there is no room for adding non-residential parking under the terms of the current freeze (Beagan 1992). As explored in Chapter One, there was significant room for parking space construction in the 1990 freeze through the ability of the Interim Parking Control Committee and Director of Traffic and Parking to grant "determinations of exclusion" from the freeze. This suggests that staff were unaware of the application of the 1990 MOA and 1990 interim parking freeze regulation.

The Boston and Cambridge parking freezes had previously gained additional significance during environmental impact review for the "Big Dig," a multi-decade, multi-billion dollar infrastructure project that depressed and covered a major elevated highway and constructing a new tunnel under Boston Harbor to Logan International Airport. During the mid 1980s and early 1990s the project underwent environmental impact review to fulfill federal and state requirements. In 1990, Secretary of Transportation Salvucci asked Secretary of Environment John DeVillars to convene a group of environmental organizations, including 10,000 Friends of Massachusetts and the

Conservation Law Foundation (CLF) to incorporate their feedback and hopefully streamline environmental impact statement (EIS) acceptance. Through this process, 10,000 Friends and CLF criticized future traffic projections for relying on overly optimistic assumptions about political commitment to expanding transit capacity. They demanded that the project's final EIS include measures to mitigate future traffic congestion, the cause of the project in the first place. As a result, in the August 1990 Environmental Secretary's certificate of the Big Dig's EIS, DeVillars required MassDOT to investigate the impacts of the mitigation measures proposed by environmental groups (Salvucci 2013). Cambridge Systematics was hired to undertake a sensitivity analysis of proposed mitigation measures, including freezes in Cambridge, downtown Boston, South Bostn, and at Logan Airport. CSI also investigated the impacts of measures such as maintaining low transit fares and a handful of other transit projects, including new vehicles, new connections between subway lines, and extended commuter rail service. This analysis showed the freezes to be the most effective in constraining traffic, followed by keeping transit fares low and then by other transit projects (Salvucci 2013).[21]

Because Environmental Impact Statement (EIS) commitments are not enforceable, the Conservation Law Foundation was prepared to sue the project in federal court so that these mitigations measures would be permanently tied to the Big Dig. Instead however, Salvucci prepared a memorandum committing the state to the Boston and Cambridge parking freezes, maintaining stable MBTA fares, and other transit projects. Pursuant to this MOA, the Boston area Metropolitan Planning Organization voted to initiate a revision to the SIP at DEP. State agencies and Governor-elect Weld and members of his cabinet supported the MOA, however the Federal Highway Administrator was not consulted prior to developing the MOA, and so when the Federal Highway Administration (FHWA) issued its record of decision for the project, the last step of the federal EIS process in April 1991, they explicitly stated that they did not support the 1990 MOA with the Conservation Law Foundation (Salvucci 2013). As a result, CLF sued FHWA and the state in August 1991.

[21] These models predicted fewer trips would result from a stronger freeze, but couldn't account for how the freeze might shift East Cambridge trips elsewhere; trips affected by the freeze were simply "removed" from the model (Moore 1994, 62-63).

The 1997 "Commercial" Parking Freeze

State officials were concerned that replacing the parking freeze could result in further legal entanglement with the Conservation Law Foundation and delayed proposing an amendment to the SIP that would replace the parking freeze with Cambridge's Vehicle Trip Reduction Program. A threat from the City of Cambridge to sue the Commonwealth for failing to act on the City's SIP amendment proposal led to a 1996 memorandum of agreement (Jacobs 2013). In this agreement the City and Commonwealth agreed to a timetable governing their work together "to draft a rule to rescind the Cambridge Parking Freeze and replace it with a commitment that the City will implement a VTRP" [Vehicle Trip Reduction Program] (City of Cambridge and MassDEP 1996).

In accordance with this MOA, MassDEP promulgated §310 CMR 60.04 approving "the City of Cambridge to implement the vehicle trip reduction program as a replacement and substitution to the Cambridge Parking Freeze." The regulation does not mandate certain measures, only noting that the VTRP could include provisions including municipal employee trip reduction measures, increases in municipal parking rates, bike and pedestrian mobility measures, transportation demand management for expansions and new development, zoning studies to consider increasing densities, replacing minimum and maximum parking requirements, and encouraging mixed use developments, and improved coordination with the MBTA. In September 2000 EPA published a proposed rule that amended the Massachusetts SIP for ozone and carbon monoxide by replacing the Cambridge parking freeze with the City's Vehicle Trip Reduction Program (65 FR §181, 56278). The agency never promulgated a final rule, apparently due to opposition from pro- freeze advocates.

In place of the 1990 Parking Freeze Ordinance, in 1997 the City adopted a new Commercial Parking Freeze Ordinance. This ordinance caps "commercial" parking spaces only, and defines commercial as available to the public for a fee. The freeze bank for commercial parking permits is capped at 13,542 spaces (§310 CMR 60.04). Currently there are around 1000 unallocated commercial parking spaces in the Cambridge freeze bank, and no permits have been applied for since the late 1990s. This is in part because developer demand for commercial parking is low and in part because of an additional city ordinance, the Parking and Transportation Demand

Management (PTDM) Ordinance, discussed below, requires commercial parking facilities to adopt traffic mitigation measures (Clippinger 2013, Rasmussen 2013).

From Supply Constraint to Demand Reduction

Susanne Rasmussen, current Director of Environmental Planning at the City of Cambridge, notes that in the late 1990s and through the early 2000s, she and other planning staff worked assiduously to document their adherence to the Vehicle Trip Reduction Program in anticipation of EPA issuing final approval for it as a SIP amendment (Rasmussen 2013). One component of staff work comprised expansion of the VTR Program to strengthen the City's case for why new policies would achieve superior VMT and emissions reductions relative to the freeze. A key component of these efforts was the development of the Parking and Transportation Demand Management (PTDM) Ordinance (§10.18).

City Council approved the PTDM Ordinance in 1998. The ordinance text notes that it was "designed to minimize the amount of parking demand" associated with development and "reduce single-occupancy vehicle trips in and around Cambridge" (§10.18.050). Elizabeth Epstein, Director of the Environmental Program at the Cambridge Community Development program during the development of the PTDM Ordinance in the mid-1990s, note that the policy came from an understanding that the city could only do so much with the provision of pedestrian, biking, and transit infrastructure without policies that targeted commuter behavior. Cambridge staff worked to develop a program that could demonstrate to state officials its appropriateness as part of a SIP amendment (Epstein notes that the state wanted to ensure that the PTDM wasn't "smoke and mirrors"), and to this end the PTDM Ordinance gives the city significant new authority to impose parking and travel demand management measures on new parking facilities. At the same time, staff designed the program to be palatable to employers and property owners; the PTDM Ordinance allows developers and employers to implement customized plans (Epstein 2013).

Since its adoption in 1998, the PTDM Ordinance has required developers proposing to construct net new parking spaces to adopt a PTDM plan that must be approved by the City PTDM Officer. Since 1998, almost forty properties have adopted PTDM plans, which are tied to parking facilities and transferred with any changes in ownership. Projects with fewer than twenty spaces must

adopt at least three travel demand measures, but do not need to report on facility mode share and measure implementation to the city. Parking facilities with over twenty spaces must adopt more comprehensive PTDM plans, submit implementation reports to the city annually, and also commit to reducing project single occupancy vehicle trips, enforceable through fines and the forced removal of parking spaces (§10.18.050). City staff require projects with more than twenty spaces to achieve a drive-alone mode share of at least 10% below 1990 Census levels, although this number is not fixed in the city ordinance and can be adjusted by staff (Groll 2013).

The Cambridge Parking Policy Package

Since at least the late 1970s the Planning Board has conditioned project approval on traffic mitigation measures through permitting processes, however prior to the adoption of the PTDM Ordinance, the City did not monitor required measure implementation. Consider the Planning Board's response in 1979 to a special Planned Unit Development permit application for a project known as Riverside Office Park:

> "The Planning Board is apprehensive about the extent to which the proposal encourages automobile usage. The Ordinance's parking requirements would be exceeded by nearly 200 spaces. This location is well served by public transportation. Furthermore, we are now at a point in history when the long-term trend of ever-increasing automobile travel may be reversing." (PUD Special Permit Broad Canal, 1979)

Despite its apprehension, the planning board did not wish to harm the market viability of the project and so approved the developer's request with limited conditions; at that time Kendall Square was largely still an industrial area, and project developers were concerned about office marketability without parking comparable to office developments elsewhere in the area (Pangaro 2013). The city's approach to mitigating the project's parking construction was through provisions enforceable through review of project designs and the permitting process. For example, the city required the developer of Riverside Office Park to reduce the size of 20% of new parking spaces to accommodate compact cars, remove several spaces to create a landscaped buffer, and finally develop plans for bike facilities, which were at the time not required by the zoning ordinance (PUD Special Permit Broad Canal 1979). Because the development predated the PTDM Ordinance, the city today has no means to monitor whether even these few conditions were implemented.

In contrast, yearly PTDM reporting allow city staff to monitor measure implementation at both projects with adopted PTDM plans and projects with special traffic mitigation requirements that predate the PTDM Ordinance (called TDM projects). A yearly PTDM report comprises a description of a subject parking facility, the results of a commuter travel mode use survey of facility users, and a summary of the implementation status of required PTDM measures. In addition, the PTDM Ordinance requires projects to submit counts of garage entrances and exits biannually to demonstrate consistency with reported mode shares. After receiving these annual reports, the Community Development Department's PTDM Officer evaluates whether PTDM project reported mode share is 10 percent below 1990 Census levels. While this reduction target is not specified in the PTDM Ordinance, staff include this drive alone mode share requirement, unique to each project, when approving initial PTDM Plans (Groll 2013).

The PTDM Ordinance empowers the Director of the Department of Traffic, Parking & Transportation (TPT) to penalize non-compliant projects by removing parking spaces or charging fines, however to date the City has never exercised this authority (Groll 2013). When companies do not meet their drive-alone mode share requirements, the PTDM Officer can require additional TDM measures. Even when companies meet their drive-alone mode share goals, yearly PTDM reporting provides a mechanism for the PTDM Officer to suggest, or negotiate, the adoption of additional TDM measures or improvements to implementation. For example, in reviewing a 2012 Report submitted by Forest City for one of its University Park phases, the Cambridge officer observed that one tenant offered a substantial quarterly cash incentive for employees who walk and bike, however very few employees knew the program existed (University Park Phase III PTDM 2012). The PTDM Officer suggested that Forest City, as the property owner, remind employees of this benefit (Groll 2013).[22] In addition, city staff are currently negotiating with Novartis over the parking fees it charges employees. While the Novartis PTDM requires Novartis to charge market rate for parking (approximately $250 per month), and in the past Novartis has charged employees this full fee, the company reduced employee parking fees for 2012. As a result, the city and Novartis began negotiating changes to the company PTDM plan (Mooney 2013). This dynamic is explored further in Chapter Three.

[22] There is some incentive for the company not to widely broadcast this incentive to avoid the costs of paying employees not to drive or take transit.

While not an explicit goal of the PTDM Ordinance, the yearly reporting requirement generates a significant amount of data not only about mode share, but also about company practices and employee opinions. This provides CDD and TPT staff with data about parking and travel demand measure implementation that informs, in the case of the PTDM Officer, approval of future PTDM Plans, and in the case of TPT staff, future recommendations to the Planning Board regarding traffic mitigation conditions. Data submitted to the city allow staff to observe how parking has been utilized, and how projects with less parking are still able to successfully market themselves. Director of Traffic, Parking, and Transportation Susan Clippinger furthermore notes that over the past decade, while the technical analysis informing TPT's recommendations has not changed, the politics surrounding parking have. Parking is no longer seen as such a decisive factor in project marketability. This allows her to make more aggressive recommendations for parking reductions (Clippinger 2013).

Policy Complementarity

The case of Technology Square illustrates the complementarity of Article 19 Project Review (and its precursor IPOP Review) and the PTDM Ordinance. Located in Kendall Square, Technology Square covers 16 acres and has long served as a research campus, and was once the host of MIT's earliest computer science research efforts in the 1960s. In 1973 MIT sold its interest in Technology Square to Beacon Capital Partners, and in the late 1990s the new owners embarked upon an ambitious redevelopment project (MIT News Office 2004). For the planned renovation, Beacon Capital Partners applied for an Interim Planning Overlay Permit for 599,000 new square feet of research and development and office use. The company originally proposed adding 662 spaces, to reach 2,776 spaces total. Because this expansion would give Technology Square a total parking supply of 2.1 spaces per 1000 square feet, the City of Cambridge granted an increase of only 442 spaces (Technology Square IPOP 1999). Staff initially insisted on an even greater reduction, however project developers complained to City Manager Healy, who overruled city staff's recommendations (Clippinger 2013). In allowing 2,596 spaces for 1,641,000 square feet of total development, the Planning Board permitted parking at a ratio of 1.58 spaces per 1,000 square feet across the project, in excess of the maximum allowable 1.5 spaces per 1,000 square feet under the zoning ordinance at the time (Technology Square IPOP Decision, 1999). Despite

receiving a permit for 2,596 spaces, Technology Square was built out to only around 1,165,000 square feet and the garage to 1593 spaces, resulting in a built parking ratio of around 1.4 spaces per 1000 square feet of development (Technology Square PTDM Plan 2011).

Figure 1-3: Technology Square Parking

	1999 Built	Proposed (Expansion)	Proposed (Total)	Granted (Total)	2013 Built
Parking Spaces	2114	+662	2776	2576	1593
Spaces/1000 square feet	2.1	+1.1	1.7	1.58	1.4

Although the Planning Board permitted more parking than staff originally recommended, it also followed staff guidance to condition the project's permit with traffic demand measures. As a result the Planning Board required Technology Square to conduct a survey of employees to determine demand for a shuttle to the MBTA Green Line Station at Lechmere and become a fees-paying member of the Charles River TMA. It also required the project to install nearby sidewalk and signal improvements and dedicate no less than 10 percent of parking spaces to carpoolers and vanpoolers to promote ridesharing. The IPOP permit required these additional traffic mitigation measures to be amended to the PTDM Plan, allowing for yearly monitoring (Technology Square IPOP Decision, 1999).

Employer Practices Absent City Policies

A major outcome of both the PTDM Ordinance and Article 19 is that the city requires select parking garages and employees to manage employee travel demand beyond what they would do absent the regulation. Forest City's Jay Kiely, who implements University Park's PTDM plan, is convinced that the PTDM successfully requires many of University Park's dozen companies to go beyond what they would otherwise offer their employees (2013). In addition, pharmaceutical company Novartis, which implements a PTDM plan for its employees, offers more benefits supporting alternative modes at its Cambridge sites than it does at its other American locations (Mooney 2013).

While some companies would likely provide some benefits for alternative commuting, it is clear that not all companies and properties would offer the same measures they do absent city requirements. The case of One Rogers Street, originally developed by the Lotus Development Corporation, provides an example of how PTDM plan development today not only produces much more robust travel demand requirements than the traffic mitigation requirements adopted before the policy, but also presents the opportunity to impose measures that property owners would otherwise not require. The Planning Board's 1987 decision to grant a special permit for a Planned Unit Development, according to provisions for PUD-4 districts in Article 13, noted that the project's allowable parking supply (2.5 spaces per 1,000 square feet of development, approved prior to maximum parking ratios) required some mitigation. As a result, the Lotus Development Corporation adopted a transit plan, applicable also to other developments in East Cambridge and Kendall Square, to maximize use of public transit. As a result, in 1989, Lotus Development Company along with CambridgeSide Galleria adopted a joint Transit Plan (Abend Associates 1989). The transit plan is basic, requiring tenants to encourage their employees to take advantage of EZ-Ride, a state carpool-matching program, the MBTA T-Pass Program, and flexible work schedules (2011 Report). Unlike future PTDM Plans, it contains no requirements for MBTA pass subsidies or employee parking fees.

Preserving Flexibility

As this Chapter has explored, opposition to the Cambridge parking freeze in the early 1990s from the Cambridge growth coalition and allied city councilors and officials prompted the City of Cambridge to adopt a comprehensive set of policies targeting demand for driving. Yet debate over the PTDM echoed many of the same concerns about competitive disadvantage and the Cambridge business environment as had the parking freeze. An October 1997 letter from the Chamber of Commerce to staff at the Community Development Department regarding the PTDM Ordinance states:

> "Many Chamber members believe that we must guard against enacting public policy that places Cambridge at a competitive disadvantage because of well intentioned but stringent regulation... we must work to shape a flexible policy that has a positive impact on the environments without being overly cumbersome to the Cambridge business community. Ultimately, the policy's language will affect location and expansion decisions, the City's tax base, the ability of businesses to ensure the measure is effective, and, of course, the region's air quality. We must ensure that the ordinance's provisions are sensitive to all of these

> issues and do not have unintended consequences resulting from a one-size-fits-all approach. Each business has unique and distinct features which make it difficult, if not impossible, for every business to comply with a strict absolute standard." (Zamparelli and Lucey 1997).

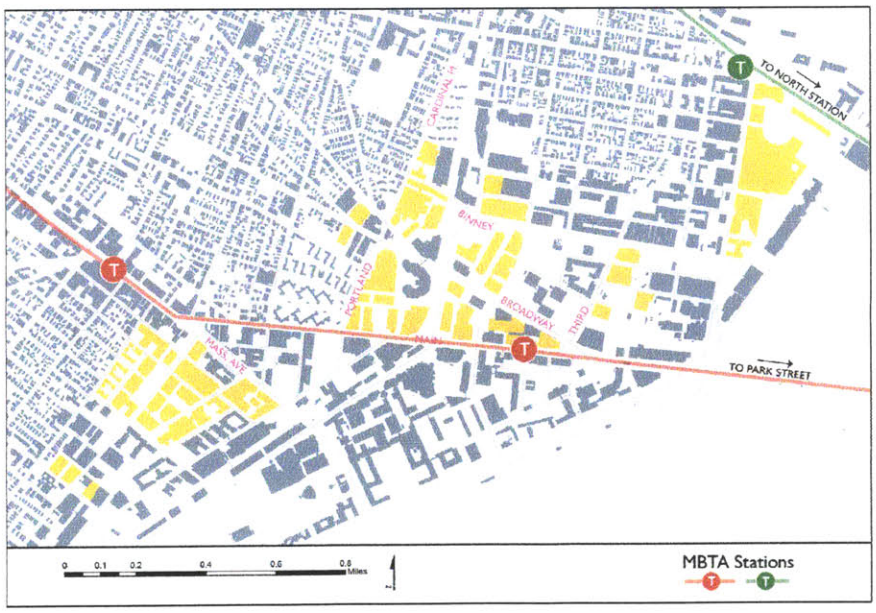
Persistent concern about the potential economic impacts of a strict absolute standard shaped the PTDM Ordinance's emphasis on flexibility. Later in the above letter, the Chamber suggested that businesses should be able to select which "two or more" measures they would adopt, to preserve "maximum flexibility" and guard against the discretion of the PTDM Officer (Zamparelli and Lucey 1997). While the PTDM Officer today has more discretion than the Chamber proposed, in practice imposing measures remains challenging and can be politically sensitive (Groll 2013).

Chapter Three examines the implications of the PTDM Ordinance and Article 19, with focus on parking supply, parking demand, and other factors influencing commuter mode choice and employer mode share in select projects in Kendall Square and Cambridgeport.

CHAPTER 3 – EVALUATING CAMBRIDGE'S PARKING AND TRAVEL DEMAND POLICIES

To replace the original Cambridge Parking freeze, the City adopted a suite of policies emphasizing incentives for alternative modes over strict limits on parking supply or commuter trips, reflecting the city's chosen approach to accommodate growing employers. The flexibility ingrained in the PTDM Ordinance and VTRP, which sought to "accommodate the diverse needs and capabilities" of the employers and institutions in the city" (§10.17.020.J), has produced great variety among TDM measure implementation, making precise comparisons difficult. Analysis of yearly reports to the city by Kendall Square and Cambridgeport employers subject to PTDM and TDM requirements nonetheless suggests the importance of restricted parking supply and parking fees to commuter mode share. It also highlights that, despite Cambridge's policies, significant underused and unleased parking supply currently exists in Kendall Square. This suggests that as the area continues to grow, if parking supply is to influence commuter behavior, developers must build parking at lower rates than consistent with current practice. The map below shows projects subject to PTDM and TDM reporting requirements in Kendall, Lechmere, and eastern Cambridgeport.

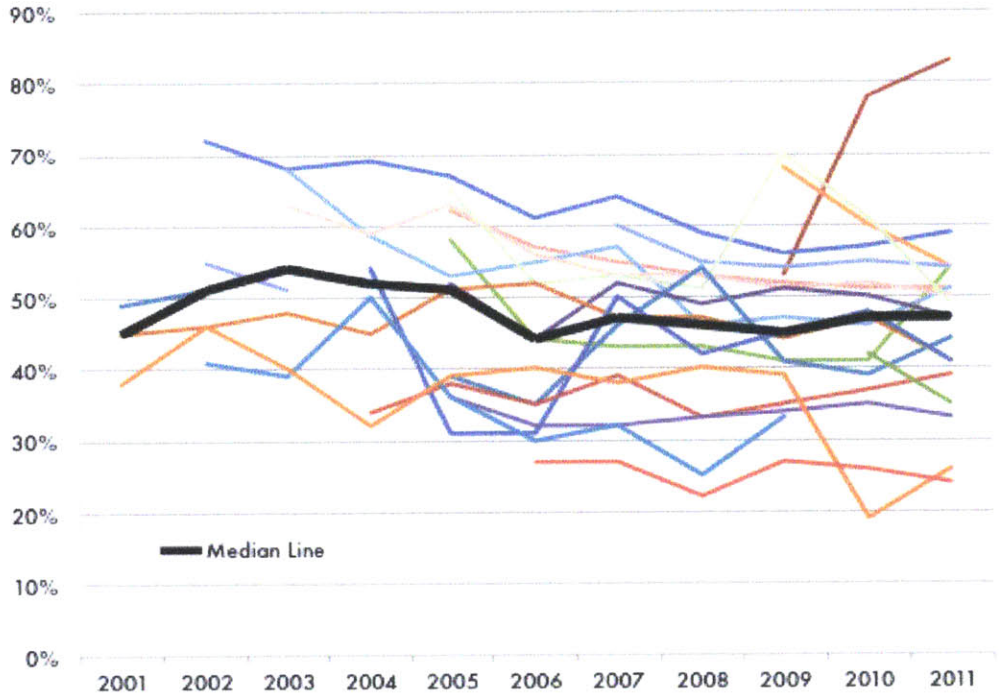
Figure 3-1a: PTDM and TDM Projects



Cambridge and PTDM Mode Share

Organizations subject to PTDM and TDM reporting requirements report a range of drive alone mode shares. Figure 3-1b charts reported mode shares over the past decade. Many organizations have not reported for all years. With notable exceptions, many company auto mode shares have remained constant, or decreased, over the past decade.

Figure 3-1b: Reported Drive-alone Mode Shares for PTDM and TDM Projects- Kendall Square and Cambridgeport



70 Percent of Kendall and Cambridgeport PTDM projects, and projects that report to the city through separate special permit requirements (called "TDM" projects), met their target of achieving a drive alone mode share of 10 percent below 1990 Census levels in 2011, compared with 60 percent of employer and mixed-use PTDM projects reporting across the city. The median drive alone modes share target for Cambridgeport and Kendall Square PTDM projects is 50 percent, which is also the median modeshare target for projects across Cambridge. Kendall and Cambridgeport median drive alone modeshare in 2011 was 47 percent, slightly higher than overall city modeshare from 2006-2008 (see Figure 3-2).

Figure 3-2: Cambridge Employee Modeshare (2006-2008)

	2000 Total	2006-8 Total	2006-8 From Cambridge	2006-8 From Abutting Towns*	2006-8 Other
Drive Alone	50.6%	46.4%	16.4%	36.6%	66.1%
Car/vanpool	8.5%	8.6%	3.6%	7.8%	11.4%
Transit	22.7%	25.4%	15.5%	41.9%	18.5%
Walk	12.6%	12.4%	42.9%	8.7%	1.6%
Bike	2.4%	3.4%	7.7%	4.5%	.7%
Other	3.2%	3.9%	14%	.5%	1.6%

**Arlington, Belmont, Boston, Brookline, Somerville, Watertown*
Source: City of Cambridge 2011b

Factors Influencing Mode Share

An organization's mode share is a measure of aggregate commuter travel choice. Literature suggests that the following categories of factors influence a commuter's choice of travel mode:

1. *Physical Environment* - population density, land use, topography, infrastructure;
2. *Mode Characteristics* - availability, accessibility, convenience, comfort, privacy, freedom, safety, travel time, cost;
3. *Individual Characteristics* – occupation, gender, age, income, car ownership, daycare responsibilities, possession of a license;
4. *Trip Characteristics* – Trip purpose, trip distance, trip origin and destination;
5. *Attitudes*-- environmental concerns, familiarity and comfort with alternative modes;
6. *Policies and TDM measures* – parking costs, transit passes, emergency-ride-home programs, communications, events (Zhou 2012).

Current literature does not imply that any one factor determines a commuter's mode choice, however mode characteristics such as accessibility, cost, and convenience are commonly highlighted as important. MPOs such as the New York Metropolitan Planning Council and the Southern California Association of Governments use models placing priority on the predictive power of the mode and individual characteristics, considering physical characteristics secondarily important (Zhou 2012). One study of TDM efforts in California emphasizes the importance of individual, trip, and mode characteristics to journey-to-work choices, which are a subset of household activity patterns that depend on use of services such as medical and child care (Giuliano 1992). Other research suggests that parking availability and price—mode characteristics—are important determinants of travel behavior (Shoup 2005).

Cambridge's parking policies largely target the mode characteristics of both driving and alternative modes to reduce drive alone mode share. They do this by depressing employee parking supply, increasing the convenience of alternative modes, and decreasing the relative costs of non-automotive modes. In one case they have also facilitated improvements to transit accessibility. In addition, aspects of the city's policies target employee attitudes. The table below in Figure 3-3 summarizes the influences of Cambridge parking and travel demand policies on mode characteristics.

Figure 3-3: City Policy Impacts on the Factors Influencing Employee Mode Choice

FACTOR	POLICY	POLICY MECHANISM	RELATED FACTORS	EMPLOYEE ASKS
Parking Supply	PTDM Zoning; Permitting	· Encourages constant supply · Commercial offsets · Reduces new parking construction	· Parking construction costs · Existing parking · Employee density · Estimated parking demand · Cambridge residency	Can I park at work?
Relative Costs	PTDM/TDM	· Requires or encourages transit subsidies, employee parking fees	· Personal characteristics · Market rate for parking · Gas prices & tolls	Is driving too expensive?
Convenience	PTDM/TDM	· Requires showers, lockers, bike racks and administration coordination	· Transit schedules and routes · Personal Characteristics · Peak hour traffic · Work hours	Is it simpler and quicker not to drive?
Accessibility	Permitting; PTDM/TDM	· Creates market for EZ-Ride	· Transit schedules and routes · Personal Characteristics · Peak traffic · Work hours	Do transit routes and schedules work for me?
Attitudes	PTDM/TDM	· Requires outreach and communication surrounding alternative modes	· Personal characteristics · Environmental awareness · Non-automobile infrastructure · Risk perception	Do health, safety, or environmental concerns influence my choice?

Policy Impacts on Employee Parking Supply

As noted previously, parking availability is considered one of the most important contributors to drive-alone behavior in many American cities; if spaces don't exist, drivers simply can't use them. Current policies affect employee parking supply in three ways. In one notable case, the PTDM Ordinance has caused a large institution—MIT—to grow without a net increase in parking to avoid ordinance requirements. Second, policies provide opportunities for city staff to review developer calculations of required parking supply as well as tenant demand for parking spaces. Third, the PTDM Ordinance requires new commercial parking facilities to "offset" trips, for example, by making payments to support local transit, thus discouraging commercial parking construction.

Incentivizing Constant Institutional Parking Inventory

Because the PTDM Ordinance only applies to developments proposing to increase net parking supply, the ordinance has incentivized MIT to maintain a constant number of academic parking spaces (Brown 2013b). In an interview, Institute staff Kelley Brown, of MIT Facilities, and Maureen McCaffrey, of the MIT Investment Management Company (MITIMCo) expressed four main reasons that MIT has avoided PTDM Ordinance:

- **MIT is in *de facto* compliance.** As a leader in commuter best practices, the Institute already does everything that would be required by a PTDM plan. City staff support MIT's commuter policies, and there would be no added benefit from officially complying with the PTDM Ordinance.
- **Future required TDMs might be imprudent.** PTDM compliance could subject the Institute to future requirements with minimal benefits and negative financial repercussions.
- **City staff discretion reduces security.** Because PTDM plans and reduction targets are set by city staff members, they could change based on individual whim. There is "little to limit staff zeal" regarding MIT.
- **Institute goals require flexibility.** It is crucial for the functioning of the Institute that faculty and other researchers have easy access to campus. This goal at times conflicts with the city's goal of reducing drive alone behavior.

MIT avoids complying with the PTDM by maintaining a constant inventory of parking spaces. For example, in 2008 MIT applied for a Project Review Special Permit for the Koch Cancer Research

Center, which added around 300,000 square feet of laboratory and office space but did not add any parking. Reluctance to comply with the PTDM has also led MIT Facilities to hold on to spaces it does not need so that it may grow in the future without meeting PTDM requirements. Each year MIT submits an inventory of all academic parking spaces to city staff to prove compliance with zoning parking requirements for institutions. In its 2012-2013 parking inventory, MIT Facilities claimed more spaces were in use than actually were, to maintain its official parking inventory at 5009 spaces (MIT Parking Inventory 2013). TPT Director Sue Clippinger responded with a letter correcting MIT's math and informing Facilities that because the Institute was leasing fewer spaces than it had in the past, it was only entitled to claim an institutional parking stock of 4,387 spaces (Clippinger 2013b). In inducing MIT's efforts to avoid compliance, the PTDM Ordinance has likely contributed to MIT's campus growth since 1998 by 30 percent (from 9.4 million gross square feet to 12.2 million square feet) without a net increase in parking (Brown 2013c).[23] The presence of unused parking combined with decreasing demand for parking over time enabled MIT to grow despite its self-imposed parking freeze (Brown 2013b).

Traffic Review Depresses Supply

As Chapter One demonstrated, Article 19 provided city staff with new capacity to influence the parking supply permitted at large developments, such as at University Park. The city's response to a Project Review Special Permit application from MITIMCo, the MIT Investment Management Company, for properties at 610 and 650 Main Street provides more recent illustration of this capacity. At the time of its permit application, MITIMCo had one laboratory tenant (Pfizer) lined up and wanted its permit to allow for either a laboratory or office tenant for the remaining space (McCaffrey 2013). Because offices have higher employee densities than laboratory spaces, MITIMCo requested enough parking to serve an office tenant: 820 spaces, or 1.4 spaces per 1000 square feet of development. City staff objected to this proposal, both because current building usage was closer to 1.07 spaces per 1000 square fear (absent a TDM or PTDM plan), and because if a laboratory tenant, with lower employee density, became the user's space, parking would have been overbuilt. Staff argued that MITIMCo should not be permitted at the outset to construct more parking than they might need for a laboratory tenant. The Planning Board agreed, granting MITIMCo 650 spaces, or 1.12 spaces per 1000 square feet. The Board did note that MITIMCo

[23] These numbers include academic space, student life and services space, and residential space, and do not include any commercial real estate owned by MITIMCo (Brown 2013c).

could later seek an amendment from the planning board after proving that a future office tenant required more parking, but that total parking could not total more than 820 spaces (650 Main Street TPT Comments 2008). MITIMCo staff cite this outcome as evidence of the city's lack of sensitivity to the risks assumed by real estate developers (McCaffrey 2013).

PTDM Requirements for Commercial Parking Reduce New Supply

The story behind Alexandria Real Estate Equities' plans to construct "Alexandria Center" reveals that the PTDM requirement for commercial parking spaces is one of several factors influencing parking supply at new mixed-use developments.

Alexandria, now the owner of Technology Square, is currently expanding its footprint in Kendall Square by 1.7 million square feet of commercial and residential uses. When completed, Alexandria Center will cost an estimated one billion dollars, stretch over 11 acres, and include a large public park (Project Review Special Permit 2009). Around the time of Alexandria's initial proposal to Cambridge City Council in 2008, the Boston Globe reported that a space squeeze was causing biomedical companies to move out of the city in search of lower rents, motivating Alexandria's development plans (Wallack 2008). When Alexandria applied for a rezoning of PUD Districts 3C and 4A to increase allowable FAR, it requested a reduction in required parking. PUD Districts at the time were subject only to parking minimums of 1.1 spaces per 1,000 square feet at the ground floor and .6 spaces per 1,000 square feet upper floors for office uses. New zoning for Alexandria's parcels capped non-residential parking at .9 spaces per 1000 square feet and required practically all parking to be underground (Alexandria Binney Street Project Final Development Plan 2010).

There are several reasons for the company's request to reduce parking requirements and acquiescence to the Planning Board's maximum of .9 spaces per 1000 square feet. First, Alexandria was having trouble filling all 1530 garage spaces in the nearby Technology Square garage, which it had acquired in 2005. Second, the PTDM Ordinance's requirements for commercial facilities reduced the desirability of providing commercial parking. Catherine Donaher, a consultant on the company's planning and zoning applications, commented that the undesirability of building commercial parking influenced the company's calculations of required supply (Donaher 2013). The PTDM ordinance requires new commercial facilities to adopt a PTDM and —instead of reducing mode share—offset trips, e.g., through funds for area transit. City staff recall that recently the developer of NorthPoint, a large mixed-use project in Cambridge, planned to provide commercial

parking, but never went through with its application for commercial permits after realizing the implications of the PTDM offsetting requirement (Rasmussen 2013). No new commercial parking spaces have been constructed in Cambridge since the mid-1990s (Clippinger 2013), likely in part due to this requirement. There are 11,980 commercial parking spaces permitted by the city today, 1,562 spaces less than the maximum cap of 13,452 cap established in the state SIP and in state regulation 310 CMR §60.04 (City of Cambridge 2013).

While the PTDM Ordinance reduces incentives for constructing commercial parking, Alexandria's plans for Alexandria Center ultimately reflect a broader shift in local developer projections of reduced employee parking demand. Donaher comments that Alexandria projected that the employees of future tenants would live in Kendall Square and surrounding areas and walk, cycle, and use transit. Donaher's observation that "developers are very practical" underscores that Alexandria's decision reflected careful financial analysis (Donaher). The penalty of overbuilding expensive underground parking is paying debt service on parking that goes unused. Boston developer Tony Pangaro observes that incentives are now firmly against supplying substantial parking in popular downtown locations, and especially Cambridge where the high water table means that parking grows increasingly expensive with depth. While the first level of below ground parking may cost $75,000 per space, lower levels cost even more (Pangaro 2013).

It is difficult to know how much the original parking freeze impacted parking supply through its replacement by the commercial freeze in 1997. Sonia Hamel, former Director of Air Policy at the MA Executive Office of Environmental Affairs, notes that, although the city's calculations of freeze bank expansion conflicted with the state's, given the freeze the City was more careful about granting parking spaces than they would have been otherwise. While difficult to quantify how many spaces would have been built absent the freeze, a February 1997 letter from the City of Cambridge to MassDEP notes that from 1992 to 1996, i.e., the interim period where the city was enforcing the parking freeze under the terms of the 1990 MOA with a cap of 13,542 spaces, project proponents across the entire city received permits for 460 fewer parking spaces than allowable by zoning (Jacobs 1997).

Parking Supply by the Numbers

Alexandria's plans for Alexandria Center and the MITIMCo plans at 650 Massachusetts Avenue both indicate that the ratio of parking spaces to built space has decreased in Kendall Square over the past two decades. Today the built parking ratio across Kendall Square PTDM and TDM projects is 1.3 spaces per 1,000 square feet (Groll 2013; PTDM 2012). In 1990, the Cambridge Assessor's office estimated that the non-residential built parking ratio in Kendall Square, excluding Technology Square, was 1.6 spaces per 1,000 square feet (see Figure 3-4).

Figure 3-4: 1990 Non-Residential Built Parking (spaces per 1000 square feet)

Central Square	**0.78**
Cambridgeport	**1.00**
East Cambridge	**1.01**
Technology Square	**1.28**
Other Kendall Square	**1.64**
Lechmere (including Galleria)	**2.25**

Source: City of Cambridge Assessor's Office (1993)

The total number of spaces at PTDM projects, or projects reporting on TDM measure implementation through special requirements, in Kendall Square alone account for around 7,200 parking spaces.[24] The City counts an additional 3,200 parking spaces in Kendall Square through its commercial parking registration program.[25] However, there are other non-residential parking facilities in Kendall Square that do not report to the city, such as Riverfront Office Park (646 spaces), and the overall number of parking spaces in Kendall Square is unknown (another MIT graduate student project will be investigating this next year). Including MIT (4,400 spaces) and the PTDM/TDM projects that report to the city in Lechmere (including the Galleria's 2,500 spaces) and in eastern Cambridgeport (including University Park's 2,600 spaces), there are at minimum 22,000 non-residential parking spaces serving these areas. Around 9500 of these spaces (35 percent) do

[24] This includes parking spaces at Technology Square, BioMed Realty Trust's Kendall Square (e.g., Genzyme), Draper Labs, Seven Cambridge Center, 301 Binney Street and 320 Bent, 50 and 60 Hampshire Street, Amgen, Biogen, and 210 Broadway.

[25] This includes parking spaces at One Cambridge Center and Three Cambridge Center (not counting spaces in these garages leased by Biogen), One Kendall Square (not counting spaces leased by Amgen), and One Broadway.

not fall under city TDM or PTDM reporting requirements. Despite the uncertainty surrounding the total number of parking spaces subject to city demand measures, it is clear that the city's policies cover a significant number of parking spaces.

Biannually the PTDM Ordinance requires projects to submit counts of garage entrances and exits during peak garage use. These surveys suggest that around thirty percent (6,300) of the total parking spaces in TDM and PTDM projects in Kendall, Lechmere, and eastern Cambridgeport (21,100) were unoccupied at peak usage. Surveying peak garage entrances and exists on one day is a rough measure of occupancy, however it corresponds with other information suggesting that not all garages are used to capacity. For its parking garage at Cross Street, Novartis reported a 93 percent garage occupancy rate, and a Novartis facilities manager reports that employees are on waiting lists for parking spaces at the Cross Street garage. In contrast, Technology Square reported 55 percent occupancy at peak usage. Alexandria acquired Technology Square in 2005, and one of its reasons for petitioning the Planning Board to lower its required parking requirement was because it was having trouble filling all of Technology Square's spaces (Donaher 2013).

Recent leases that Biogen negotiated with Alexandria and Boston Properties for office and laboratory space in Kendall Square suggest what will happen to underused and unleased parking spaces in the future if new development in Kendall Square continues to provide parking at lower ratios than existing developments. Biogen is relocating its corporate headquarters to Kendall Square from the suburbs. The company has signed a lease for 275 parking spaces and 305,000 square feet at the forthcoming 224 Binney Street, part of Alexandria Center—a ratio of .9 spaces per 1000 square feet, corresponding to the maximum non-residential parking ratio Alexandria can construct. In search of more parking, as part of a lease of additional office space from Boston Properties, Biogen brokered a "sweetheart" deal for parking at more than 2 spaces per 1000 square feet for any available parking spaces across Boston Properties' three Kendall Square garages (Lyon 2013). These 400 spaces are a small portion of all Cambridge Center garage space (around 3,100 spaces), but indicate that surplus exists and if given the chance, companies will lease it. Through these two leases Biogen will have access to parking at its two new sites equivalent to 1.35 spaces per 1,000 square feet. It is possible that limits on the distances that accessory parking may be located from principle use may hinder reallocation of surplus parking for some projects. The zoning ordinance requires accessory parking to be located on lots no more than 300 feet from a

principle non-residential use (Z.O. 2013 §6. 22.1), unless otherwise specified. Zoning for University Park and for PUDs are notable exceptions, allowing parking to be located within the broader zoning district (Z.O. §13.77; Z.O.§15.51.2). Biogen's example suggests that if companies are able to lease excess parking in response to lower new built parking ratios, there may be a delay before constrained parking supply influences employee mode choice.

Impact of Parking Supply on Mode Share

The two PTDM projects that in 2011 reported the lowest drive alone mode shares—Seven Cambridge Center (25 percent) and Novartis (33 percent)—have relatively low built parking ratios.

Seven Cambridge Center is one of eleven buildings in the 2.7 million square feet mixed-used development Cambridge Center, owned by Boston Properties. Seven Cambridge Center's West Garage provides 731 parking spaces, including 151 commercial parking spaces, for five buildings totaling 931,791 square feet of office, research, and retail space (.8 spaces per 1000 square feet). This means that in 2011, 1619 employees had access to 580 spaces, or on average .36 spaces per employee. Of employees surveyed in May 2011, around 47 percent took transit, 25 percent drove alone, 9 percent carpooled, 9 percent biked, 6 percent walked, and the rest worked from home. In recent years, reported drive alone mode share has ranged between 24 and 27 percent (Seven Cambridge Center PTDM 2011).

Novartis owns a research building at 250 Massachusetts Avenue, along with the Cross Street parking garage, and also leases office and parking spaces from University Park and Technology Square. The Cross Street garage provides parking at a ratio of .33 spaces per 1,000 square feet, and drive alone mode share has hovered close to this number for the past seven years, as long as Novartis has implemented a PTDM plan (2012 PTDM Plan). A facilities manager notes that there is a waiting list for parking spaces at the Cross Street garage, and that even individuals who walk or bike during the summer pay for their spaces during those months to avoid losing them.

TDM data submitted for office buildings One Rogers Street and One Charles Park, which share the One Rogers Street garage in Lechmere, suggests that employee density can influence parking

constraints, and in turn drive alone mode share. The One Rogers Street garage serves 365,000 square feet of office space with 656 parking spaces (1.8 spaces per 1,000 square feet). Until recently, much of this space has been unleased. One Rogers Street and One Charles Park were designed to serve around 1,000 office workers, which they did in the early 2000s. In 2010 when reported drive alone mode share first spiked to almost 80 percent, around 45 percent of the property was vacant and some space was leased for storage (One Rogers Street TDM Report 2010). Stephanie Groll, the current PTDM officer, cautions that the high reported drive alone mode shares of the past several years may also be attributable to the property manager's lack of effort in TDM reporting (Groll 2013), highlighting that the quantitative data used to evaluate the city's policies is collected differently by different projects. For its 2012 report at Groll's suggestion, the company hired transportation consultant TransAction Associates, which provides these services to other PTDM and TDM projects in Cambridge (One Rogers Street TDM Report 2012).

Policy Impacts on the Relative Costs of Travel Modes

There is great variety among the transit subsidies and parking fees required or encouraged by PTDM and TDM plans in Cambridgeport and Kendall Square. While all PTDM plans for Cambridgeport and Kendall Square properties require MBTA pass subsidies, they do not stipulate particular amounts. Parking fee requirements likewise vary from property to property. Property owners with many tenants have requirement to include lease language encouraging tenants to charge market rate for parking, resulting in varieties from company to company, even within the same property. Even when tenants are required to subsidize transit, not all do; Boston Properties tenants who use the Seven Cambridge Center West Garage must provide at subsidy of at least 50 percent of the federal maximum for pre-tax transit benefits, however the 2011 report revealed that only eight of ten tenants met this minimum (50 percent of $245 in 2012) (Seven Cambridge Center PTDM Report 2012). Figure 3.5 illustrates the range of MBTA subsidies offered to employees and fees charged to employees.

Figure 3-5: Sample of the Diversity of Parking and Transit Fees, 2011 and 2012 Reports

Garage	Company	Parking Fee	Transit Subsidy
One Rogers Street	MA Teachers' Retirement System	$190/mo	None
One Rogers Street	IBM	None	None
One Rogers Street	Pegasystems	None	$200/month
One Rogers Street	Mimeo	None	100%
University Park	Millenium	$8.67-$48.75 bi-monthly fee	$110/month
University Park	Aveo	$120/month fee	$130/month
Cambridge Center	Biogen	None	$230/month
Cross Street; University Park	Novartis	$120; $150 fee	$125/month
Kendall Square	Genzyme	$75/month fee	60%
Kendall Square	Momenta	None	100%
Kendall Square	Vertex	None	$210/month

Sources: PTDM/TDM Reports for Kendall Square (2012); One Rogers Street (2012); University Park (2012); Novartis (2012) and Biogen (2011)

Some companies appear to strive for equity or near equity in subsidies they provide to employees, for example, by subsidizing transit passes and parking expenses fully or near fully, as do Biogen, Genzyme, Mimeo, Momenta, Pegasystems, and Vertex (Kendall Square PTDM Report 2012; One Rogers Street TDM Report 2012) (Biogen TDM Report 2011). The MA Teachers' Retirement System charges its employees for both parking and transit (One Rogers Street TDM Report 2012).

Requiring that companies charge parking fees for employees is neither a common nor a popular TDM measure. PTDM plans for garages generally only require property owners to charge tenants per parking space and require lease language that encourages tenants to charge employees market

rate for parking. Novartis is an exception; as owner of the Cross Street garage and an employer, the PTDM plan for Novartis requires the company to charge its employees market rate for parking (Novartis PTDM Report 2012). Human resources staff at the company oppose this practice. Currently the company provides a $100 subsidy for parking to all employees, and is negotiating with the city over changes to its PTDM plan. Novartis is concerned that the PTDM requirement for market rate parking fees requires Novartis to imply to employees that it does not respect their needs to balance family and other obligations by driving to work. The company also recognizes that not all of its competitors charge market rate for parking because they don't fall under the PTDM or are tenants of a PTDM property, and so are not subject to this particular measure. This creates a feeling of inequity (Mooney 2013). Employers seem more willing to subsidize employee commuting choices equally than to charge market rate for parking. The City's policies aimed at constraining parking supply may lead to increases in the price of securing parking in the future, but absent other changes in policy, it is not clear that these price increases will be passed on to employees.

Even when employees pay some amount for parking, the price an employee pays to park can be too low to impact behavior. MIT Institutional Research staff conducted a recent conjoint preferences survey on MIT employee commuting behavior, and caveated results showing that time and spatial convenience were the most important factors impacting travel choice by observing that current parking costs were too low at MIT ($700-1,200 per year) to impact commuter behavior (Brown 2013b). The Institute's experiment with a commuter innovation illustrates the unpopularity of charging employees for parking as a method of changing commuting behavior. Two years ago the MIT Parking Committee, with assistance from the MIT Transit Research Program, embedded MBTA pass chips in the IDs of a sample of MIT employees, resulting in reductions of 3-4 percent in parking use by employees who had both a parking pass and a transit pass. Beyond this trial incentive, the Institute has nonetheless been hesitant to move beyond "carrots" to "sticks" by implementing marginal cost parking prices (MIT Transit Research Program 2013).

MIT's reluctance to experiment with policy "sticks" highlights an important aspect of the City of Cambridge's policy suite: it requires property owners to implement unpopular policies, but also allows them, if they choose, to deflect employee anger onto the City. In contrast to MIT's hesitance to charge employees more for parking, Alexandria's Technology Square charges its own

employees market rate for parking. In an e-mail to employees responding to criticism that surfaced surrounding expensive parking in the PTDM survey, the company deflected blame to the city with "Per our parking contract with the City of Cambridge, our rate can't be lower than the market rate. The City of Cambridge's mindset is to foster green-friendly alternative methods of transportation. On a side note, we're happy to report that we haven't raised prices in the garage in more than 6 years" (Technology Square 2013).

Organizational Mode shares

PTDM reports suggest that many different factors influence employee mode choice and organizational mode share. Figure 3-6 below indicates whether the eight largest Kendall Square and Cambridgeport projects feature a constraint in parking supply, parking fees, and subsidies for MBTA passes. All of the projects listed below are paying members of the CRTMA and EZ-Ride, and all offer secure bike facilities to employees.

3.6: Parking Supply and Cost Features for TDM and PTDM Projects in Kendall Square and Cambridgeport Environs (2011 and 2012)

Properties	Spaces/ 1000 sf	Parking Fees	MBTA Pass Subsidy	Drive Alone Mode Share
Biogen	1.5	no	$230/mo.	54%
Kendall Square (e.g., Genzyme)	2.5	variable	variable	50%
Draper Labs	1.5	$30/mo	$115/mo.	50%
One Rogers Street	1.8	variable	yariable	47%
University Park III & IV	2.10 & 1.42	variable	yes	44% & 47%
Technology Square	1.37	variable	yes	39%
Novartis	.73	$130 or $150/mo	$125/month	33%
7 Cambridge Center	.78	variable	50% required*	24%

**indicates not all tenants complied in 2011*

This chart suggests that relatively constrained parking supply is factor in Novartis' and the Seven Cambridge Center West Garage's low mode shares. That Biogen will be leasing spaces across all of Cambridge Center's three garages (North, East, and West) in the future suggests that employees might not feel constrained by parking. It is possible that a low built parking ratio is self-enforcing; the tenants who lease space with lower parking ratios may anticipate not having as many employees, or not as many employees who drive. It is important to caveat this by noting that Novartis also leases additional garage space from both University Park and Technology Square; however, because employees prefer to park at the Cross Street garage, there is a waiting list for employees to park there, indicating a supply constraint.

Literature indicates that parking fees impact mode choice particularly when ample parking supply is available to employees (Shoup 2005) (Litman 2006). PTDM and TDM data offer no definitive conclusions, but suggest that this may be the case in Kendall Square. Biogen makes parking spaces available to employees at a ratio of 1.5 spaces per 1000 square feet, and as company practice covers parking fees for all employees (and is not required to do otherwise by its TDM Plan). Biogen's drive alone rate in 2011 was 54 percent, and has been around this number for the past several years (TDM 2011). Draper Labs makes parking available at the same ratio as Biogen, charges employees only $30 per month, and in 2011 had a drive alone mode share of 50 percent. PTDM reports do not indicate the mode shares of different tenants within PTDM properties, making generalizations about larger multi-tenant properties difficult. Nonetheless, at the "Kendall Square" development on Third Street, Genzyme, Momenta, and Vertex subsidize parking and transit in near equal dollar amounts, and together accounted for ninety-three percent of the employees at Kendall Square in 2012. In that year the property reported a drive-alone mode share of 50 percent, without a physical constraint on parking (the report listed that almost 300 spaces were open to the public) (Kendall Square PTDM 2012).

The reported mode shares for One Rogers Park up until recently, as discussed previously, indicate how low employee density can serve to increase effective parking supply for employers absent parking fees. The 2012 TDM survey for One Rogers Park reported increases in employee density, as well as a decrease in drive alone mode share, to 47 percent. 903 property employees leased only 452 spaces out of 646 in the garage. The garage is not open to the public, indicating that

parking is still not constrained for employees. The report however notes that tenants, some of them new, offer a variety of incentives for transit that were not present in previous reports. A snapshot of the cost structures of the property's four largest employers suggests that parking fees, and relative travel mode cost, have some influence on mode choice. IBM, which offers no transit benefit but pays for employee parking, leases 125 spaces for 136 employees. The Massachusetts Teachers' Retirement System charges employees $190 per month to park and leases only 5 spaces for 91 employees (TDM 2012). Pegasystems subsidizes transit and parking relatively equally, and leases 309 parking spaces for 579 employees. Parking fees cannot however explain why software company Mimio leases no parking spaces; the company offers both full transit and parking subsidies to its 48 employees, but leases no parking spaces (One Rogers Street PTDM 2012).

While parking supply, parking fees, and transit subsidies appear to be important contributors to employee mode choice, they are relatively mutable in the short term when compared with more fundamental factors that influence employee mode choice, namely transit accessibility and personal characteristics.

Policy Impacts on Transit Accessibility

Transit accessibility comprises network reach, transit schedule frequency, the distribution of uses and destinations, and individual and trip characteristics (Ducas 2011). Although transit accessibility is largely fixed in the short term and not the focus of current parking and travel demand policies, Cambridge's policies have impacted the accessibility of Kendall and Central Squares to North Shore commuters through the EZ-Ride Shuttle.

Over the past twenty years the city has conditioned a number of development projects on the study and provision of shuttle service to Lechmere and Kendall Stations. These requirements led several key Kendall and Central employers to pool resources, along with support from MIT and the City of Cambridge, to support EZ-Ride, a consolidated bus service that began operations in 2002 between North Station, Kendall Square, MIT, and Cambridgeport (Campbell 2002; Gascoigne 2013). The EZ-Ride shuttle is now the major program of the Charles River Transportation Management Agency (CRTMA). Founding partners designed the route to incentivize employees who lived on the North Shore to commute by rail; at the time, far fewer residents of the north

shore took transit compared with residents of the South Shore and western suburbs. Ridership has risen steadily since service began in 2002, and currently numbers around 2,200 passengers per day (Gascoigne 2013).

Jim Gascoigne, Executive Director of the Charles River Transportation Management Association, notes that there is a direct relationship between the requirement by the city to provide shuttle service and initial participation in EZ-Ride; without this mandate, EZ-Ride would not have had initial private backing. Key original founders included IBM/Lotus at One Rogers Street, Biogen Idec, Technology Square, and University Park, who realized that they could provide employees with more frequent, comfortable, and reliable joint service, for less money, than they could through private company shuttles (Gascoigne 2013). Financial support for the EZ-Ride Shuttle is a required PTDM measure for a number of additional companies, including Novartis and Draper Labs (Draper Labs PTDM Report 2011, Novartis PTDM Report 2012).

Despite the benefits for North Shore commuters provided by EZ-Ride, transit accessibility to home communities remains a significant barrier for many employees who do not live in Cambridge and adjacent cities. Employees who responded to the 2012 Novartis PTDM survey indicated that the factor most likely to change a change in commute behavior was "better public transportation to/from my community," followed by increased transit pass subsidies and by "more frequent buses or subway trains" (Novartis PTDM 2012). Survey data also reveal the importance of other municipalites' actions to promote alternative modes. The 2012 PTDM report for Kendall Square (including Genzyme) noted that all 10 of the properties survey respondents who live in Acton take public transportation, noting that in 2010 the city opened two remote parking lots and shuttle service to the commuter rail station, to counter constrained parking at the station. In comparison, all thirteen of survey respondents from Newton drove alone to work (BioMed Realty Trust: Kendall Square PTDM Report 2012).

Policy Impacts on Employee Attitudes and Awareness

Employee perceptions of the convenience of various modes are an important determinant of mode choice in Kendall and Cambridgeport. The majority of employees in recent PTDM reports cite Central and Kendall Squares cite "convenience" or "overall commute time" as the most

important reasons for choosing a commute mode, with cost the second, e.g., 80 percent of respondents in Seven Cambridge Center ranked convenience as the most important reason for a commute (Novartis PTDM Report 2012; Seven Cambridge Center PTDM Report 2012; University Park III PTDM Report 2012). TDM measures target the convenience of alternative modes primarily through facility provision: preferential carpool spots, the provision of locker and shower rooms, covered and secure bike parking, and the availability of T-passes onsite. Other support includes participation in the CRTMA, providing access to the guaranteed ride home program—providing vouchers for taxi rides home for employees who don't drive to work—and a rideshare matching program. These are relatively low-cost measures compared to subsidies for MBTA passes, and are very common across PTDM plans.

Despite these efforts, PTDM surveys indicate that there are substantial gaps in employee awareness regarding commuter benefits that support alternative modes. For example, Millenium offers employees who neither park nor use a subsidized transit pass the option of a quarterly payment of $175 (less taxes), however an employee survey indicates that only 3 percent of surveyed employees were aware of this "cash-out" benefit (University Park PTDM Report 2012). PTDM surveys reveal that many employees are not aware of the existence of transit subsidies, the CRTMA guaranteed ride home program, and the availability of computerized assistance with finding a carpool, although they cite these measures as those that would make them less likely to drive alone to work. The awareness of new hires is likely to be particularly important; a human resources director at Novartis observes that company employees generally do not shift their commute mode once established (Mooney 2013).

The city's PTDM Officer observes that attitudes toward commuting among employees appear to have more to do with employer culture than with the basic provision of TDM measures such as events or newsletters (Groll 2012). This suggests that without commitment to alternative transportation as part of company culture, PTDM measures will be less effective in achieving mode shift among employees who have the choice of alternative modes. PTDM employee surveys reveal that transit suffers from a poor reputation, but for reasons largely related to unreliability, crowding, and scheduling, not because of the relatively desirability of driving (Novartis PTDM Report 2012, Kendall Square PTDM Report 2011).

Attitudes toward cycling may hinder the effectiveness of cycling-focused TDM measures. Cycling is not currently a large portion of any single property's mode share, making up around three to nine percent of employee commutes across PTDM reports during the survey period in May; this number is certainly lower in the fall and winter months. A Novartis human resources director admitted to having a difficult time promoting cycling to employees because the company has lost employees in cycling accidents (Mooney 2013). Jim Gascoigne, Executive Director of the Charles River TMA, observes that intimidation is a barrier to cycling, and that some might cycle to work instead of drive if they could identify with it as a utilitarian activity and not as a lifestyle statement or movement (2013). Employee surveys indicate that safety concerns are a key deterrent to bike commuting (Novartis PTDM Report 2012; University Park PTDM Report 2012; Kendall Square PTDM Report 2012).

Policy Limitations

Survey responses also indicate the importance of personal and trip characteristics that are less likely to be influenced by parking and travel demand management policies: the need for a car for household errands or to transport children to school or childcare (10 percent of survey respondents in 2012 University Park III and 7 percent in University Park IV). Up to 15 percent of survey respondents at some large properties note that they choose to drive because they need a car for errands and to accommodate irregular work hours that are incompatible with transit schedules (15 percent in University Park III and IV and Novartis 2012 PTDM reports).

There is the possibility of employer or garage programs to respond to these needs. Childcare provider Bright Horizon is now a tenant at One Rogers Street, and the 2012 property TDM report indicated that this partially addressed employee concerns about the need to drive to fulfill childcare responsibilities. The report does not however indicate how many employees base a commute decision from the availability of childcare at Bright Horizon (One Rogers Street TDM Report 2012). Alexandria currently uses some of the excess parking supply at the Technology Square garage to meet employee demand for flexibility. The garage offers tenant employees the option of purchasing day-passes for parking, enabling employees to drive only a couple times a week without paying a monthly fee (Mooney 2013). As future Alexandria Center tenants begin to make use of

Technology Square's spaces, this arrangement is unlikely to survive if available parking supply contracts along with continued growth in Kendall Square.

Parking In the Context of Projected Growth

The city is preparing for the addition of 8.5 million square feet of new development by 2030 in the Central and Kendall Square areas of Cambridge, an 80 percent increase from current development. City staff and planning consultants estimate that 80 percent of this growth, or 5.6 million square feet of research and development space and 1.2 million square feet of office space, will directly serve office and research uses (City of Cambridge 2011a). The City Council recently approved MIT's zoning petition for an increase in allowable density to make way for both commercial and academic development on the Institute's lands in Kendall Square. This rezoning petition set parking at a maximum of .9 underground spaces per 1000 square feet of commercial space, and .8 spaces per 1000 square feet of laboratory space. Applying these ratios to anticipated office and research space in Central and Kendall Squares would yield 5,500 new parking spaces. City planning staff estimate that offices have employee densities of 3 employees per 1,000 square feet, while research and development has 2.2 employees per 1,000 square feet, meaning that new development might serve 15,900 employees. These employees would have access to around .35 spaces per person of new parking. This does not however take into account the spaces that may be unleased or underused currently in Kendall Square, which, as discussed earlier, could be as many as 3500 parking spaces at PTDM and TDM office and mixed-use developments in Kendall Square and Cambridgeport alone (note that this number is less than the 6.300 potentially unused spaces in the Kendall, Cambridgeport, and Lechmere areas discussed previously). Assuming that at least 3,500 parking spaces could be redistributed, new developments in Kendall and Central Squares might have access to as many as 9,000 spaces per 6 million square feet of office and research development, yielding a parking ratio of 1.5 spaces per 1,000 square feet and giving employees access to .56 spaces per employee. These are the ratios currently present at Draper Labs and Biogen (see Figure 3-6), which reported drive alone mode shares of at and over fifty percent, respectively, in 2011 (Biogen PTDM Report 2011, Draper Labs PTDM Report 2011).

There is considerable uncertainty surrounding many aspects of these estimates. For example, actual office employee density may be higher than 3 employees per 1000 square feet of office space in

the future. Multinational company Johnson & Johnson recently signed a lease for 9,000 square feet of space in Cambridge Center, and with this amount of space they will be receiving 9 spaces. The company however will be remodeling the interior toward an open floor plan, to fit approximately 50 employees in that space (Lyon 2013). If only 9 employees out of 50 can drive (20%), this suggests that Johnson and Johnson assumes that the remainder of its employers won't drive, or will be able to obtain parking elsewhere in Kendall Square. If 10 percent of new office development have employee densities similar to Johnson & Johnson, parking supply may be more tightly constrained, and available at a ratio closer to .45 spaces per employee. Regardless, this suggests that if developers continue constructing parking at a ratio of .9 spaces per 1,000 square feet and if new developments are able to access existing parking resources, there will be a delay before parking supply will have significant impacts on mode share.

CHAPTER 4 – REGULATING PARKING IN A GROWING CITY

Reintroducing the Actors

Much about Cambridge's history and experience regulating parking is unique: the insistence of Cambridge officials in joining the downtown Boston parking freeze; the "stickiness" of the freeze as a federal rule; the activism of well-organized residents, the redevelopment potential of the city's former industrial lands, and the efforts of staff to replace the freeze with programs to reduce parking demand. Yet the interests expressed by Cambridge growth coalition, limited growth, and planned density advocates are not unique to Cambridge, nor are the challenge of reducing traffic, greenhouse gas emissions, and pollutant levels. Lessons from Cambridge's past experience regulating parking must inform its future.

The positions taken by growth coalition members and their allies within city government, limited growth activists, and planned growth advocates, regarding parking, travel demand, and development have evolved to varying degrees since the 1970s. Figure 4-1 summarizes the ways in which growth groups' views have changed over time. Particularly significant is that parking and traffic policies are no longer a motivating concern for many growth coalition members and limited growth advocates. Developers and employers view the city's regulations as part of doing business in Cambridge (Lyon 2013), while limited growth activists have focused more intensively on the impacts of new development on gentrification and housing (CRA 2013). City planning staff are investigating ways of strengthening the City's policies in light of new growth, but, as before, affirm the importance of balancing parking restrictions with economic development (Groll 2013).

Figure 4-1: Growth Groups in Cambridge Parking Policy History, Revisited

	Growth Coalition	Limited Growth	Planned Growth
Growth should be:	encouraged to support tax base	limited, controlled	planned, managed
Position on Parking 1970s-1980s:	supply restrictions harm regional competitiveness	cap parking supply to cap development	new parking necessary for economic development but should be minimized
Position on Parking 1990s-2000s:	parking demand programs should not harm regional competitiveness	parking and traffic policies inadequate to mitigate impacts on neighborhoods	demand-side policies can replace supply restrictions
Position on Parking in context of K2C2 2013:	parking regulations part of doing business in Cambridge, but should not become onerous	parking supply restrictions shouldn't reinforce gentrification by favoring childless residents	growth provides opportunity to revisit parking policies so long as they do not harm economic development

Conversations with current and former city staff and a former city consultant suggest the pervasiveness of the view within the City that strict parking supply restrictions harm growth (Epstein 2013, Groll 2013, Jacobs 2013). Concern that limiting parking hurts the city's attractiveness to developers and employers motivated resistance within City government to the parking freeze (Epstein 2013), with reason; permit records and interviews with participants in some of Kendall Square and Cambridgeport's older redevelopment projects (Broad Street Canal, University Park) reveal that developers in the 1970s and 1980s feared that undersupply of parking would severely constrain project marketability (Donaher 2013; Pangaro 2013). In response to fear that less parking would cripple project marketability, it is unsurprising that City officials intent on increasing the local tax base and improving "blighted" industrial areas, would eschew attempts to limit new parking absolutely.

Even the City's moves to ease strict supply restrictions with demand-side restrictions attracted a "defensive posture" from the Chamber of Commerce and other Cambridge business interests, as Elizabeth Epstein, head of environmental planning efforts for the City of Cambridge during the

1990s, observes (Epstein 2013). In spite of Cambridge's present financial health, city staff are today concerned that attempts to strengthen the PTDM Ordinance would provide an opportunity for it to be weakened in the name of reduced regulations for businesses and developers (Groll 2013).

It is beyond the scope of this thesis to investigate the extent to which business-friendly policies, compared with other factors, such as the economic benefits associated with hosting Harvard and MIT and with Red Line and commuter rail reach and capacity are accountable for the Cambridge's strong financial health and real estate market performance. The fear today that Cambridge might lose competitive advantage from strengthened parking and travel demand policies should however be questioned. Initial opponents of the City's policies are now supporters. Jay Kiely has implemented Forest City's PTDM program for University Park for twelve years, and admits to having been "one of the guys that went kicking and screaming into PTDM," afraid of its repercussions for Forest City's tenants. He notes, "I can safely say now that the City was right." He observes that tenants at University Park have largely embraced PTDM requirements, and in some cases gone above and beyond their requirements (2013). Ted Lyon, principal at local real estate services and consultant Cassidy Turley and broker of Biogen's recent lease agreement with Alexandria and Boston Properties, observes that nothing in the City's PTDM requirements is a "deal breaker" for companies, and that they are simply part of doing business in Cambridge (Lyon 2013).

The Importance of External Mandates in Cambridge Parking Policy History

Because of concern within City Hall that strict parking and travel demand policies would harm economic development, external mandates in the form of regulations, lawsuits, and petitions were instrumental to the development of Cambridge's current parking polices. Without its attempts to achieve VMT reductions equivalent to parking restrictions, it is assured that the City would not have adopted the VTRO or the Parking and Travel Demand Management Ordinance in the forms that they did. IPOP provides an example of how citizen activism could lead to the passage of stronger traffic mitigation measures originally opposed by city staff. The 1991 draft traffic mitigation ordinance developed by transportation planner Richard Easler was never adopted by City Council, but it later informed the recommendations made by Cambridge Residents for Growth Management. In 1998, Cambridge Residents for Growth Management successfully petitioned City

Council to pass IPOP (Pitkin 2013). Although staff initially resisted IPOP, they now recognize it as a positive development for the city (Rasmussen 2013). The Council later made IPOP provisions permanent as Zoning Article 19 (Clippinger 2013). In this way, citizen pressure on the City to protect neighborhoods from the negative externalities of growth provided planned density advocates with opportunities to adopt and implement current parking policies.

Citizen-led parking freeze litigation, IPOP, and permitting moratoriums did not limit development to the extent their proponents hoped. The city's current parking and travel demand policies nonetheless reflect the concerns of Cambridge resident activists about the impacts of development on neighborhood livability. The city's sensitivity was also in line with accepted planning guidance at the time (Epstein 2013). In analysis of recent trends in planning research and practice (Blanco et al., 2009) professors Ann Forsyth, Kevin Krizek, and Daniel Rodriguez call livability, while not easily quantifiable, one of the most successful rationales cities have used to appeal to voters and other decision-makers for support of non-motorized transportation (Blanco et al., 2009). This suggests that, at least conceptually, in Cambridge and in other growing municipalities, planned density and limited growth advocates might find enough common ground surrounding livability concerns to form coalitions and adopt policies mitigating traffic through parking and other travel demand policies.[26]

Despite this potential for collaboration, in Cambridge today it appears that the most active limited growth advocacy organization is unprepared to ally with the city over strengthened parking and travel demand policies. Limited growth advocates characterize the efforts the city defines as promoting livability—supporting walkable, bikable density, and including controls on residential parking supply—as policies supporting gentrification that will benefit the childless, car-free adults who will work at new jobs in Kendall Square (Hoffman 2013). Furthermore, limited growth activists

[26] One notable new element of current debate over city growth in Cambridge is the advocacy in favor of the city's upzoning plans in Central and Kendall Squares from a pro-density citizens group, the first time this has occurred in the memory of current city staff, who have worked at the city since the early 1990s (Clippinger 2013, Rasmussen 2013). It is conceivable that public pressure not from limited growth activists but from planned density supporters, such as the group A Better Cambridge, could force the city to strengthen its parking and travel demand policies. On its website, the group lists both "growth" and "livability" as core principles (ABC 2013).

criticize City staff and officials for being too willing to cooperate with developers (Cambridge Residents Alliance 2013). The tactics used by developers in the past to quiet resident opposition have only strengthened resident concern that Cambridge Planning Board and City Council members are bartering density in exchange for nominal community benefit concessions.[27] In addition, Cambridge developers now know that one of the ways they can receive permission to increase density is to propose a relatively low built parking ratio (Rasmussen 2013). While planned density advocates view this as success for city policies, limited growth advocates see this as the city underestimating, or even willfully ignoring for the sake of continued development, the impacts of any development on traffic and on MBTA Red Line capacity (Kaiser 2012). Some residents further criticize the city for reversing past citizen-led efforts to reduce development intensity. Alexandria's successful 2008 upzoning petition from reversed an East Cambridge downzoning petition that had been implemented in the early 2000s as the result of a resident-led moratorium on development permitting in East Cambridge. As a result, Alexandria's 2008 upzoning proposal was contentious; not least because residents cite it as a visible example of how the City is unresponsive to their concerns. Criticism of the proposed rezoning submitted to the City Council charged that Alexandria's proposal "violates the spirit, intent, goals, and actual zoning language of the 2001 [East Cambridge Planning Study] "housing zone" with its gradually stepped up heights and density from Charles Street to Binney Street (Horowitz 2009).

Using Demand-side Policies to Reduce Supply

As explored in Chapter Three, current parking policies have contributed to a high quantity of unused and unleased spaces in Kendall Square, which undermine the effectiveness of City policies to reduce commuter driving. Built parking supply derives not just from zoning and permitting requirements, but also from developer calculations about anticipated demand relative to the maximum number of spaces per square foot of leased space that property owners offer each tenant (Lyon 2013). As explored in Chapter Three, concern for project marketability led to parking oversupply in many projects. Alexandria's willingness to be subject to zoning limiting parking to .9 spaces per 1,000 square feet for an increase in allowable density indicates that high parking ratios

[27] A former East Cambridge resident interviewed for this thesis, who wished to remain anonymous, noted that she and others left neighborhood activism after developers of "Kendall Square" (e.g., Genzyme), Lyme Properties, sued her and other citizen activists for alleged damages through opposing this project (the case was dismissed).

are no longer needed in exchange for project marketability. It is also evidence of existing parking supply; Alexandria owns Technology Square, which has underused parking spaces (Donaher 2013). That future tenant Biogen found a .9 ratio unacceptable (and so brokered a separate lease for office space, yielding 1.3 spaces per 1,000 square feet across both leases) suggests a more complicated picture. Alexandria rezoned its parcel without confirmed tenants; if developers knew that a future tenant wanted a higher parking ratio, they would likely wish to provide that parking on site (Lyon 2013). This not only indicates the critical importance of parking supply controls but also demonstrates how anticipated tenant demand for parking drives parking supply.

Developer decisions are circumscribed by development timescales; the financial risk associated on a development project lifecycle (e.g., 5-10 years) associated with providing fewer parking spaces than tenants desire in the short run might be greater than the risk of having unused spaces in the long run. This reflects a core problem with environmental externalities; energy, driving, and parking are not priced adequately to reflect the social harm they inflict in air pollution, congestion, noise and greenhouse gas emissions. Regulation arises in part to correct for inadequate pricing for driving, and because parking itself has negative social cost due to the opportunity cost of the magnitude of the space devoted to holding parked cars in cities.

Framing parking oversupply as a problem of inadequate parking pricing invites policy approaches that seek to price parking according to its negative impacts on traffic, emissions and urban density. Several city policies already do this, with positive effects. The PTDM requirement that commercial parking spaces "offset" trips to the facility, through for example payments for local transit, reduces the desirability of operating unused spaces commercially. In addition, as part of recent PUD zoning amendments for MIT's properties in Kendall Square and for Alexandria's Binney Street ("Alexandria Center") project, Cambridge City Council required all new parking to be built underground, at cost of $75,000-$100,000 per space (Z.O. §13.59.5). Although this requirement is largely in place in mitigate negative urban design impacts, it also brings the value of a parking space closer to its true social cost.

Another important way in which parking is underpriced relative to its social and environmental costs derives from the common practice of employer-paid parking. One of Donald Shoup's core argument's is that developers calculate provide parking based on desire to fulfill demand for *free*

parking (2005). As discussed in Chapter Three, parking costs in Kendall and Cambridgeport are not uniformly passed on to employees. While the city's policies aimed at constraining parking supply will likely further increase the price of securing parking in the long run, absent other changes in policy, if price increases are shielded from employees, employee demand for parking may not drop accordingly.

As explored in Chapter Three, parking fees for employees are among the most difficult TDM measures to impose and enforce. Parking prices for employees vary widely across PTDM and TDM projects, as they undoubtedly do across the entire city. A critical problem with current employee transportation subsidy policies is that they lock drivers into driving because it is generally impermissible to have both a parking space and a transit pass to avoid doubling employee benefits. PTDM surveys indicate that many employees commute by car to facilitate errands and fulfill family responsibilities (Kendall Square 2013; Technology Square 2013). Yet there are likely drivers who would take an alternative mode some days if they had the option. One commuting innovation that seeks to address this issue is the "universal access" or mobility pass, which combines parking and transit access and benefits to support multi-modal commuting. Two student researchers at the MIT Transit Research Group have explored in depth the potential for a mobility pass at MIT (Block-Schachter 2009; Hester 2004). Mobility passes, which combine parking and transit access into one employee or student account, have been used at a handful of universities and metropolitan areas (e.g., Phoenix, Denver and King County, WA), and on a limited scale at MIT. Over the past two years MIT has trialed a version of the mobility pass, resulting in modest but significant reductions in parking use (3.4-4.5 percent). Reductions would likely be greater had the trial included marginal cost pricing for parking, a measure deemed by MIT staff to be too great a "stick" for the trial (MIT Transit Research Program 2013).

In Cambridge, the PTDM Ordinance authorizes staff to impose travel mitigation measures and facilitate employer innovation in commuter choice practices. Requiring that employers implement a flexible commuter mobility pass with per-use fees would allow employers to subsidize employee transportation equally—and therefore be more acceptable to employers—while pricing parking closer to its full social and environmental costs. Through the PTDM Ordinance, the city could require garages to price parking based on use and require tenant employers to price employee parking and transit per use. A pass granting access to both a garage and to the MBTA, credited or

otherwise funded equally for all employees, eliminates employer resistance to implicitly valuing employees' lifestyle choices unequally. Because monthly parking fees are higher than all but a few MBTA commuter rail passes, a per-use pricing scheme for both parking and transit still provides clear financial incentive for employees not to drive, and incentivizes employers to provide robust TDM measures to discourage driving. Requiring this scheme of all TDM and PTDM employees would also eliminate the perception that current city policies are unfair in their lack of uniformity regarding parking fee requirements, as discussed in Chapter Three.

It is possible that garage revenues would decrease with the introduction of a universal commuter pass. A recent attempt by Amgen to reduce its monthly parking usage at the One Kendall Square garage (formerly known as the Binney Street garage) suggests that garages with unused parking might be initially the most opposed to a universal pass scheme. Several years ago Amgen received approval from the City to eliminate its required parking minimum because not enough employees were using the spaces the company was required to lease as a zoning requirement (Rasmussen 2013). Amgen was however unsuccessful in renegotiating the terms of its 99-year lease with One Kendall Square; the company continues to pay for monthly parking spaces that its employees do not use (Groll 2013).

Requiring garages to adopt a pay-per-use pricing scheme for tenant employees could be made more palatable to parking garages with underused spaces by allowing garages to operate unleased spaces as commercial parking spaces. Participation in the pay-per-use and mobility pass scheme should arguably fulfill the PTDM offsetting requirement for commercial parking spaces. Having a mechanism that allows garages to more effectively share existing parking spaces would also strengthen the city's case for reducing the allowable parking supply in the zoning ordinance and reducing permitted supply through Article 19 project review.

In addition to efforts to more appropriately price parking, the City should consider ways to strengthen PTDM effectiveness by increasing employee awareness of existing measures. As noted in Chapter Three, PTDM surveys generally report low employee awareness of the measures designed to increase the convenience of ridesharing, such as the CRTMA Emergency-Ride-Home program and the state Rideshare database. It is likely that ridesharing is not more common because it reduces employee flexibility, but it is also possible that more individuals would carpool if they

knew about these programs or could be enticed to try them. The City could encourage property owners to offer incentives, such as free parking for a week, to individuals who try ridesharing, or by sponsoring campaigns to enter more drivers, especially new employees, into the Rideshare Database. Focus on new employees is likely to be particularly effective; a Novartis human resources director observes that once company employees settle into a commute routine, they aren't very likely to change (Mooney 2013). The city could examine how TDM measures could improve employee awareness, for example, by ensuring that new hire orientations include materials developed by the City, such as pamphlets, presentations, or even videos. Alternatively, the City could impose a TDM measure requiring certain thresholds of employee awareness regarding key commuter incentives, such as transit subsidies.

Enhanced City Capacity

While it is clear that parking supply and price are important factors influencing employee mode choice, consolidating years of PTDM report data into a database would enable further analysis of current and potential TDM measures and further initiatives. Yearly PTDM and TDM reporting generates a deluge of data in paper form that the City can only minimally process given current staffing constraints. Digital reporting could lessen the challenge of data entry. Consolidating employee survey responses would also help staff identify the extent to which personal and trip characteristics, such as home location and childcare responsibilities, influence mode choice. As indicated in Chapter Three, the most commonly reported reason for drive alone commuting is that transit schedules and routes do not meet employee needs. In 2012 the City for the first time required PTDM reports to indicate employee residency, providing staff with information linking low transit access in communities such as Newton to high numbers of driving commuters. Use of this data could bolster the City's case for transit service expansion in key corridors. PTDM data could also be used to initiate conversations between Cambridge staff and outlying communities about commuter facilities; the 2012 report for the Kendall Square development, which includes Genzyme, noted that the town of Acton recently expanded its park and ride facilities at the commuter rail station, and that as a result all ten company employees from Acton now commute by transit. Finally, PTDM survey questions could be tailored to assess interest in on-site childcare as a travel demand measure. The city's draft Vehicle Trip Reduciton Ordinance in 1990 proposed excluding

daycare that exclusively serves onsite employees from FAR requirements (Draft Traffic Mitigation Ordinance 1990).

To increase the leverage of its staff to insist upon more robust travel demand plans, the City should also revisit its current PTDM mode share reduction target, which requires PTDM properties with more than 20 parking spaces to achieve a drive-alone mode share of at least 10 percent less than 1990 Census levels (for the Census block in which the project is located). Tying the reduction target to 1990 Census levels acknowledges that properties across the city have different levels of transit accessibility (Groll 2013). A10 percent reduction target not only is easily achievable for many projects (achieved by 70 percent of projects in Cambridgeport and Kendall Square), but also allows overall commuter trips in the city to grow with the growing Cambridge workforce. The city could instead tie its reduction goal to an assessment of roadway capacity and total drivers, and move toward adopting a program with the participation of all employers over a certain threshold and all parking facilities, not just those who constructed parking facilities after 1998.

Revisiting Supply Restrictions

Finally, the City must consider whether its supply-side parking policies are fit to their stated purposes of discouraging unnecessary auto use and promoting transit, cycling, and walking (Z.O. §6.10). Demand-side policies are currently insufficient for two main reasons: absent more aggressive parking pricing policies, demand will continue to drive excessive parking supply. Second, even as demand adjusts based on changing employee preferences and the success of demand-reduction policies, there is a lag-time in developer response due to the multiple years of the development project lifecycle. This makes city supply-oriented policies critically important. As a lawyer for Forest City noted in an interview, developers today don't have as much leeway to built the parking they think might be required for parking marketability when there is a maximum parking ratio specified by zoning (Brown 2013a). Current parking management policy guidance advocates that cities reduce minimum parking requirements and instead establish parking maximums, as the city has begun doing for recently rezoned districts in Kendall Square (e.g., PUD Districts 3C, 4A, and 5). These steps are positive and should be implemented more widely.

As explored in Chapter Three, there is evidence that a significant, but highly uncertain, number of parking spaces in Kendall are currently underused. These underused space pose a challenge for the City: if spaces remain underused, valuable real estate will continue to be lost to parking. On the other hand, if the spaces are redistributed to accommodate new tenants, there may be delay before constrained parking supply influences employee mode choice. For these reasons, an effective parking supply policy would enable existing parking spaces to be redistributed among users while constraining future built parking ratios. To enable sharing, the city might eliminate the proximity requirements for accessory parking that currently affect some zoning districts and also allow garages to adopt a pay-per-use parking employee scheme to count as the offsetting requirement under the PTDM program requirement. Future built parking supply would then need to be limited at future developments so as to account for spaces freed for redistribution or sharing by policy adjustments above.

A district-based parking freeze for Kendall Square and Central Square could provide a tool for constraining supply. The South Boston freeze, established in 1993, illustrates the potential for cooperation among city staff, developers, and environmental groups to produce policy that restricts parking supply in a growing city. Motivated by concern that improved access to the airport via the Ted Williams Tunnel from South Boston would lead to spillover airport parking on former industrial lands in South Boston, city staff at the Boston Air Pollution Control Commission, Boston Redevelopment Authority, and Transportation department convened a parking freeze advisory committee in the early 1990s. The committee included prominent Boston developers as well as the Conservation Law Foundation, and developed a district-based freeze proposal for South Boston with the support from a South Boston City Councilor. Estimating that an appropriate freeze cap would be based on expected development over the next thirty years in South Boston, the committee settled on a desired built parking ratio of .5 spaces per 1,000 square feet of development, resulting on a cap of around 25,000 total parking spaces. The freeze includes three separate districts to distinguish between predominantly residential areas, industrial areas, and commercial areas, and does not separate between employee and commercial parking. The freeze furthermore requires parking space owners to pay a $10 fee per space per year to fund freeze administration (Glascock 2013). While Cambridge has worked to bury the federal rule requiring a fixed limit on parking supply in the city, Boston has continued experimenting with district-based

parking freezes specifically to manage commuter parking. As South Boston grows, the viability of a policy limiting total employee parking will be tested again.

Regulating Parking in a Growing City

In July 2012, the Boston Globe reported a paradox: between 2000 and 2010, the Kendall Square area of the City of Cambridge added almost four million square feet of commercial and residential development (a 38 percent increase) while traffic on its three main thoroughfares decreased by around 14 percent (Moskowitz 2012). Reflecting on the history, evolution, and implementation of Cambridge parking policies invites speculation as to how growth coalition, limited growth, and planned density advocates might interpret this news. Growth coalition members and planned density advocates likely take it as a sign of success. Development has continued in spite of the City's parking and travel demand management policies, which are both flexible enough not to restrict growth and effective enough to reduce traffic in the face of growth. From the perspective of a limited growth advocate, there is a counter narratives behind the news reported in the *Globe*'s article: this news distracts from the pressing challenges posed by anticipated development in the form of gentrification.

Battles over Cambridge parking policies over the past forty years have never been just about parking, or even just about traffic. In the early 1970s, the City supported the parking freeze as a land use measure to prevent commuter parking from engulfing Kendall Square and Lechmere. Quite apart from the technical analysis completed to support replacing the freeze with the Vehicle Trip Reduction Program, the City of Cambridge argued to the state and EPA in the early 1990s that the parking freeze was unfair to Cambridge employers, businesses, and residents, and has administered the freeze in accordance with this conviction. Cambridge's parking policies cannot escape its growth politics, and in the future will continue to be shaped by conflict between growth coalition interests, limited growth activists, and planned density advocates over the role of parking policy in a growing city.

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