Transit-oriented development
- parking policies – strategies for limiting greenhouse gases

Mayank J. Patel • 29 April, 2011
TRANSIT-ORIENTED DEVELOPMENT PARKING POLICIES
STRATEGIES FOR LIMITING GREENHOUSE GASES

PROFESSIONAL REPORT
Submitted in partial satisfaction of the requirements for the degree of Master of Urban & Regional Planning
Department of Planning, Policy, & Design
University of California • Irvine

AUTHOR: MAYANK J. PATEL
Faculty Advisor: Kenneth Chew
April 19, 2011

CLIENT: CITY OF OAKLAND
Iris Starr • Division Manager of Infrastructure Plans & Programming

ACKNOWLEDGEMENTS
I thank the following individuals for their insights and guidance with this:
Kenneth Chew, Garrett Fitzgerald, Katherine Kleinbaum, Margaret Lin, Scott McKay, Amit Naik, Jeff Pace, Bob Santos, Allison Schwartz, Iris Starr, Ernie Vazquez, Bruce Williams, and Victor Van Zandt.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF FIGURES</td>
<td>i</td>
</tr>
<tr>
<td>EXECUTIVE SUMMARY</td>
<td>iii</td>
</tr>
<tr>
<td>CHAPTER 1. INTRODUCTION</td>
<td>01</td>
</tr>
<tr>
<td>PROBLEM STATEMENT</td>
<td>02</td>
</tr>
<tr>
<td>AUDIENCE</td>
<td>02</td>
</tr>
<tr>
<td>OBJECTIVES</td>
<td>02</td>
</tr>
<tr>
<td>SIGNIFICANCE</td>
<td>03</td>
</tr>
<tr>
<td>CHAPTER 2. BACKGROUND</td>
<td>05</td>
</tr>
<tr>
<td>THE CITY OF OAKLAND</td>
<td>05</td>
</tr>
<tr>
<td>WHY PARKING MATTERS</td>
<td>10</td>
</tr>
<tr>
<td>THE STANDARDIZATION OF PARKING</td>
<td>11</td>
</tr>
<tr>
<td>FACTORS THAT AFFECT PARKING COST &amp; THE MONETARY COST OF INSTALLING PARKING SPACE</td>
<td>12</td>
</tr>
<tr>
<td>CHAPTER 3. WHAT’S ‘SMART’ ABOUT ‘SMART PARKING’ &amp; WHY SHOULD IT REPLACE THE EXISTING PARADIGM</td>
<td>15</td>
</tr>
<tr>
<td>SMART GROWTH &amp; PARKING</td>
<td>15</td>
</tr>
<tr>
<td>TODS &amp; PARKING</td>
<td>18</td>
</tr>
<tr>
<td>CHAPTER 4. METHODOLOGY</td>
<td>23</td>
</tr>
<tr>
<td>SOURCES: EXISTING POLICY, SITE VISITS, AND INTERVIEWS</td>
<td>23</td>
</tr>
</tbody>
</table>
# CHAPTER 5. CASE STUDIES

<table>
<thead>
<tr>
<th>Case Study</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARKING POLICIES IN THE BAY AREA</td>
<td>26</td>
</tr>
<tr>
<td>CASE STUDY 1: FRUITVALE TRANSIT VILLAGE</td>
<td>28</td>
</tr>
<tr>
<td>Project overview</td>
<td>28</td>
</tr>
<tr>
<td>Project description</td>
<td>28</td>
</tr>
<tr>
<td>Site context</td>
<td>29</td>
</tr>
<tr>
<td>Background</td>
<td>31</td>
</tr>
<tr>
<td>Parking</td>
<td>32</td>
</tr>
<tr>
<td>Parking utilization study</td>
<td>37</td>
</tr>
<tr>
<td>CASE STUDY 2: MACARTHUR TRANSIT VILLAGE</td>
<td>42</td>
</tr>
<tr>
<td>Project overview</td>
<td>42</td>
</tr>
<tr>
<td>Project description</td>
<td>42</td>
</tr>
<tr>
<td>Site context</td>
<td>44</td>
</tr>
<tr>
<td>Background</td>
<td>44</td>
</tr>
<tr>
<td>Proposed parking policies &amp; strategies</td>
<td>46</td>
</tr>
<tr>
<td>CASE STUDY 3: INTERNATIONAL BOULEVARD TOD</td>
<td>49</td>
</tr>
<tr>
<td>Background</td>
<td>49</td>
</tr>
<tr>
<td>Proposed plan</td>
<td>50</td>
</tr>
<tr>
<td>Proposed off-street parking policies &amp; design recommendations</td>
<td>51</td>
</tr>
</tbody>
</table>
CHAPTER 6. ANALYSIS .......................................................................................................................................................... 62
AN ASSESSMENT OF EXISTING TODS (CASE STUDIES) & THE CITY ‘S GENERAL PLAN & ZONING CODE........................................ 62
WHAT PLANNERS, DESIGNERS, DEVELOPERS, & COMMUNITY MEMBERS HAVE TO SAY ABOUT UNCONVENTIONAL TOD PARKING POLICIES ......................................................... 66
LESSONS LEARNED .................................................................................................................................................................. 68

CHAPTER 7. CONCLUSION .................................................................................................................................................. 70
BEST PRACTICES .................................................................................................................................................................... 71
RECOMMENDATIONS ............................................................................................................................................................. 73
CLOSING THOUGHTS ............................................................................................................................................................... 76

REFERENCES .......................................................................................................................................................................... 77

APPENDICES
APPENDIX A ........................................................................................................................................................................ A1
APPENDIX B ........................................................................................................................................................................... A2
APPENDIX C ............................................................................................................................................................................... A3
APPENDIX D ............................................................................................................................................................................... A4
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>CITY OF OAKLAND CONTEXT</td>
<td>06</td>
</tr>
<tr>
<td>02</td>
<td>INTERNATIONAL BOULEVARD</td>
<td>09</td>
</tr>
<tr>
<td>03</td>
<td>PARKING CONSTRUCTION COST PER SPACE &amp; AREA CLASSIFICATION</td>
<td>14</td>
</tr>
<tr>
<td>04</td>
<td>CONVENTIONAL DEVELOPMENT DESIGN SCHEME</td>
<td>19</td>
</tr>
<tr>
<td>05</td>
<td>TRANSIT-ORIENTED DEVELOPMENT DESIGN SCHEME</td>
<td>19</td>
</tr>
<tr>
<td>06</td>
<td>EXISTING BAY AREA POLICIES</td>
<td>27</td>
</tr>
<tr>
<td>07</td>
<td>FRUITVALE TRANSIT VILLAGE</td>
<td>29</td>
</tr>
<tr>
<td>08</td>
<td>FRUITVALE TRANSIT VILLAGE AERIAL</td>
<td>30</td>
</tr>
<tr>
<td>09</td>
<td>FRUITVALE BART PARKING STRUCTURE</td>
<td>33</td>
</tr>
<tr>
<td>10</td>
<td>FRUITVALE BART PARKING STRUCTURE CONTEXT</td>
<td>34</td>
</tr>
<tr>
<td>11</td>
<td>FRUITVALE TRANSIT VILLAGE PARKING BREAKDOWN</td>
<td>35</td>
</tr>
<tr>
<td>12</td>
<td>5-15 EXCERPT</td>
<td>36</td>
</tr>
<tr>
<td>13</td>
<td>ON-SITE PARKING (GARAGE)</td>
<td>37</td>
</tr>
<tr>
<td>14</td>
<td>INSIDE GARAGE A</td>
<td>38</td>
</tr>
<tr>
<td>15</td>
<td>GARAGE HOURS</td>
<td>38</td>
</tr>
<tr>
<td>16A</td>
<td>PARKING UTILIZATION STUDY</td>
<td>39</td>
</tr>
<tr>
<td>16B</td>
<td>PARKING UTILIZATION STUDY</td>
<td>DECEMBER 22, 2010</td>
</tr>
<tr>
<td>16C</td>
<td>PARKING UTILIZATION STUDY</td>
<td>DECEMBER 23, 2010</td>
</tr>
<tr>
<td>17</td>
<td>MACARTHUR TRANSIT VILLAGE RENDERING</td>
<td>42</td>
</tr>
<tr>
<td>18</td>
<td>MACARTHUR TRANSIT VILLAGE</td>
<td>PHASE 1 PLAN</td>
</tr>
<tr>
<td>19</td>
<td>MACARTHUR TRANSIT VILLAGE SITE AERIAL</td>
<td>45</td>
</tr>
<tr>
<td>20</td>
<td>FRUITVALE CARSHARE POD</td>
<td>48</td>
</tr>
<tr>
<td>21</td>
<td>HISTORIC INTERNATIONAL BOULEVARD</td>
<td>50</td>
</tr>
<tr>
<td>22</td>
<td>BRT ALIGNMENT</td>
<td>51</td>
</tr>
<tr>
<td>23</td>
<td>INTERNATIONAL BOULEVARD TOD &amp; BRT PLAN</td>
<td>52</td>
</tr>
<tr>
<td>24</td>
<td>INTERNATIONAL BOULEVARD TOD PARKING INTENT &amp; POLICY</td>
<td>53</td>
</tr>
<tr>
<td>25</td>
<td>CARSHARE POD PROXIMITY</td>
<td>57</td>
</tr>
<tr>
<td>26</td>
<td>INTERNATIONAL BOULEVARD TOD TYPE 1</td>
<td>58</td>
</tr>
<tr>
<td>27</td>
<td>INTERNATIONAL BOULEVARD TOD TYPE 2</td>
<td>59</td>
</tr>
<tr>
<td>28</td>
<td>INTERNATIONAL BOULEVARD TOD TYPE 3</td>
<td>60</td>
</tr>
<tr>
<td>29</td>
<td>INTERNATIONAL BOULEVARD TOD TYPE 4</td>
<td>61</td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

Providing the “right” amount of parking is difficult. The high availability of “free” parking may encourage more driving. However, an inadequate supply of parking may also create problems. For instance, parking shortages can cause drivers to unnecessarily circulate streets to find available parking, consequently increasing the amount of vehicle miles traveled (VMT) and greenhouse gases emitted (GHGs). This report explores parking policies that support and accommodate smart growth goals and limit vehicle trips and thereby, help reduce GHGs. More specifically, this report focuses on innovative off-street parking strategies and policies for transit-oriented developments (TODs).

The report is organized into three main sections.

- **Section One: Parking influences individual travel behavior and therefore, deserves close consideration (Chapters 2 & 3)**
  The first section presents the history of off-street parking regulations, explains the implications of oversupplied parking, describes the cost (i.e., environment, social) of parking to society, and discusses new paradigms that offer alternative parking strategies to supplant conventional standards.

- **Section Two: Existing conditions in the City of Oakland through three case studies and analysis (Chapter 5 & 6)**
  The second section defines the core of this report. The second section looks at three TOD case studies and reviews the City of Oakland’s existing policies and regulations via the General Plan and Zoning Code. This is followed by an analysis that identifies the gap between Oakland’s actual and desired conditions coupled with a look at the benefits and challenges of implementing progressive parking policies. One of the biggest challenges of parking and transportation is communication. Not many individuals want to pay for parking, nor do they want a ticket for parking overtime. And in many cases, individuals do not want to have to pay for a permit to park in their residential neighborhood. How to best communicate the function of parking management in a growing city, where demand may continue to outpace supply remains an important question.

- **Section Three: Best practices useful for the City of Oakland and recommendations for future projects (Chapter 7)**
  Lastly, the third section tries to collate the gathered information. After speaking with private and non-profit developers, local and out-of-state planners, designers, business owners, and community members, it is clear that a dichotomy exists when it comes to progressive parking policies, namely those that reduce the amount of parking. Both sides include a mixture of planners and residents. However, designers and developers tend to find themselves on one end of the spectrum more than the others. Based on the conversations, it can be inferred that those that are not directly affected by developments with reduced parking requirements tend to be more optimistic about unconventional policies. The last section considers these aspects and culminates by offering off-street TOD parking recommendations—*establish clear communication, meet developers and lenders, borrow practices, incentivize good design, conduct project-specific studies*—ones that try to avoid developer and community resistance—that may help the City of Oakland realize its goal of reducing GHGs.

In sum, this report is intended to serve as an informational tool for the City of Oakland as the City develops and implements parking standards, programs, and policies for future TODs. This report is not a comprehensive source for TOD parking issues and information. Instead, the report is meant to serve as an initial step on which additional, more site-specific, and in-depth analysis ought to build on.
Some believe global warming is just a natural cycle and question its severity as a problem. Despite the skepticism, the argument that the global temperature is rising is not contested. Though the data and figures vary, the consensus is that the earth is getting warmer. Whether the increase in temperature is attributed to carbon emissions, water vapor, ocean temperatures, or any combination of these variables is debatable. However, it is accepted that greenhouse gases (GHGs) are major pollutants that threaten the environment. This report explores innovative parking policies that help reduce vehicle miles traveled (VMT), and consequently the amount of GHGs emitted into the environment. Moreover, the report discusses the problems and costs associated with “free” parking and provides recommendations for alternative-parking policies for transit-oriented developments (TODs) that may help reduce GHGs.

Although innovative policies are encouraged, it is important to note that they may be faced with harsh realities when implemented. It is necessary to understand that a) the success of innovative parking policies in one community does not guarantee success in another, and b) just because innovative parking policies have proven effective once, does not necessarily mean they will prove effective again (even within the same community). Under certain conditions and circumstances (i.e., community character, need, actual demand, etc.) unconventional parking policies may be ineffective. The success of innovative parking policy relies on a combination of things, primarily political will, community support, and collaboration between the city, developer, and lender. Given the need to change the manner in which parking is addressed for environmental, livability, and equity reasons, cities should create and push for innovative policies, but they should proceed with caution—bearing in mind the community’s vision, goals, and needs.
PROBLEM STATEMENT
The City of Oakland has expressed interest in tailoring its parking policies and establishing alternative mechanisms for meeting parking requirements in order to reduce greenhouse gas (GHG) emissions. Parking deserves attention because the high availability of free parking encourages automobile trips, which ultimately leads to increased air pollution. Thus, to some degree, parking policy influences commuters’ and shoppers’ decision to use automobiles or transit.

AUDIENCE
This report is intended for the City of Oakland Planning Staff and/or other City officials who may be interested in learning about innovative parking policies that help limit GHGs. However, the report is structured and compiled in a fashion as to any individual with little planning background can capture its essence. This report provides a general overview of progressive parking strategies, namely for smart growth or new urbanist developments such as TODs, and hopefully, it also serves as a basic tool for making more informed decisions about parking policy.

OBJECTIVES
The purpose of this report is to offer parking strategies that help reduce GHGs. In addition, the aim is to identify innovative parking strategies or policies that can be applied to future TODs in Oakland as well as incorporated in the City’s regulations. That being, the report objectives are:

- Examine the City of Oakland’s current parking policies through three TOD case studies, the City’s General Plan, and its Zoning Code.
- Identify gaps between existing parking policies and City’s goal to reduce GHG via progressive parking policies.
- Offer guidelines/recommend TOD parking policies or strategies that can be used to help reduce carbon emissions.
SIGNIFICANCE

Exploring innovative parking policies is significant because the excessive and free-of-cost parking may not only deter the use of public-transit, but it may also mute the goals and objectives of TODs or other smart growth developments. Parking policies that reduce requirements for certain types of developments or contain a pricing aspect may not only limit VMT and GHGs, but they can also make housing more affordable and land use more efficient. Thus, a well-crafted set of parking policies or strategies can support the State’s AB 32 (GHG) emission reduction targets, comport with the vision and direction of SB 375, and help the City of Oakland achieve its climate action goals as stated in the draft Energy & Climate Action Plan (dECAP).

Decisions about transportation are not always made with a comprehensive review of the diverse needs and interrelationships that influence both travel behavior and livable communities. Rarely are these decisions based on a clear vision about a community’s future. Instead, much of the current transportation planning process is disjointed, planned by numerous agencies and built on a project-by-project basis, often in reaction to traffic congestion and other issues. Parking is arguably the single most important determinant for the success of a development, and understanding parking demand for a specific site or development requires many resources. Yet, even with valuable resources, parking demand may still prove difficult to capture. As a result of this challenge, parking demand is rarely carefully studied. Instead, cities typically create parking requirements based on standards produced by the Institute of Transportation Engineers’ Parking Generation, which is viewed as the leading authority on parking demand and not necessarily on the actual demand of a particular site (Shoup D. C., 2005; Wilbur Smith Associates, 2007; Metropolitan Area Planning Council, 2010). Consequently, current parking policies and practices may be inefficient in many cases.

Conventional parking policies focus on quantity because there is an established assumption that more is better (Smith, 2005; Shoup D. C., 2005; Litman, 2006; Mukhija & Shoup, 2006). With that assumption comes the belief that there can never be too much parking. However, there is growing awareness...
that parking can play a major role in impacting urban form. More importantly, with the climate change challenge, cities are desperately looking for ways to control GHGs. In the case of Oakland, officials realize that alternative mechanisms to meet parking requirements are essential in the fight against GHGs. There is an understanding that conventional parking policies may be obsolete and restrict the City from achieving its goal of reducing the city’s GHG by 36% (based on the 2005 GHG levels) by the year 2020 (Public Works Agency-City of Oakland, 2010). Oakland recognizes this and for that reason the City has chosen to commit itself to reduce energy use and causes of climate change.

The City addresses parking concerns within their recently developed dECAP, which is under review by City Council. In general, the dECAP “recommends GHG reduction actions and establishes a framework for coordinating implementation, as well as monitoring and reporting on progress” (Public Works Agency-City of Oakland, 2010, p. 3). Under the transportation and land use aspect, the dECAP identifies the need to develop parking policies and strategies to reduce parking demands and GHG emissions.

There are three main obstacles to not exploring progressive parking policies:

1. Economic inefficiency,
2. Urban sprawl instead of smart growth, and
3. Increase in VMT and traffic, which leads to greater GHGs.

Therefore, progressive parking policies that espouse smart development, separate the cost of parking from housing, and encourage alternative travel modes ought to replace conventional parking policies (i.e., “free”/subsidized parking).
CHAPTER 2  BACKGROUND

THE CITY OF OAKLAND

Located in Alameda County, Oakland is nestled between the Cities of Alameda, Berkeley, Emeryville, and San Leandro. With a population over 360,000, Oakland is one of California’s largest cities (Bay Area Census-City of Oakland). Abutting the eastern shore of the San Francisco Bay, Oakland is in a prime geographic location (see Figure 01). Hence, it is no surprise that a thriving port, an international airport, and major transit facilities have made Oakland the major hub for commerce, transportation, and international trade in the Bay Area.

Oakland is a progressive city rich in history and culture. Whites and Blacks make up the largest racial/ethnic groups with 36.9% and 29.8% of the city’s population, respectively. The other major groups are Asian Americans and Hispanics. With close to 70% of the population consisting of minorities, Oakland is definitely home to a diverse group of people (Bay Area Census-City of Oakland).

While Oakland faces many of the same challenges as other older cities (i.e., poverty, disinvestment), it does not hesitate to take on those challenges. As a matter of fact, many of these challenges present a great opportunity to improve existing conditions. A prime geographic location, an extensive and well-functioning transportation system, and a diverse population are strong reasons for the City to “renew” and revive many of its dilapidated areas (Community and Economic Development Agency). Doing so, will not only strengthen the City’s economy, but it will also create a healthier, safer, attractive community that stimulates the region.

As a forward-thinking city, Oakland is committed to reducing its energy use and causes of climate change. With respect
Figure 01: City of Oakland Context
Source: Google Earth
to this commitment, the City of Oakland has created a draft Energy and Climate Action Plan (dECAP) which aims to “identify and prioritize actions that the City can take to reduce energy consumption and greenhouse gas (GHG) emissions associated with Oakland” (Public Works Agency-City of Oakland, 2010, p. 18). The dECAP provides the City with over a hundred action items to achieve a 36% reduction in GHG emissions by the year 2020. Many of these action items focus on three primary sources of GHG emissions that the report categorizes as the following: 1) Transportation & Land Use, Building Energy Use, and Materials Consumption & Waste (Public Works Agency-City of Oakland, 2010). Among several other targets, the dECAP states that the City must reduce VMT annually by 20% in order to achieve 36% reduction in GHG emissions.

Given that, the transportation and land use focus becomes particularly significant. This is an appropriate time to focus on transportation and land use because currently, Oakland’s Planning Department is in the process of refining the land use element to better represent the actual conditions (City of Oakland). Therefore, this is not only useful to examine existing land use, but it is also a fitting opportunity to modify or implement new policies and strategies to help reduce GHG emissions.

The dECAP reports that transportation is responsible for over half of Oakland’s direct GHG emissions. As a result, the dECAP identifies a number of key strategies to help the City reduce GHG emissions under the transportation and land use focus. One of the strategies is to “refine parking policies to encourage low-carbon mobility” (Public Works Agency-City of Oakland, 2010, p. 58). To some degree, the land use refinement process currently being conducted by Staff may serve as a great opportunity to modify parking requirements and/or policies to help reduce VMT and limit GHGs. In this way, the parking policy strategy can be realized without using additional resources.

Refining parking policies to encourage low-carbon mobility is an important strategy because parking policies can have a major impact on transportation choices, especially in a city like Oakland where many public transit options are available. Furthermore, parking policies can also affect the quality and
success, in terms of minimizing automobile usage and limiting environmental impacts, of TODs. Recently, the California Department of Transportation (Caltrans) awarded the City of Oakland a $245,000 grant as part of the Community-Based Transportation Planning Grant program. The grant will help Oakland prepare a plan that assesses TOD opportunities at select locations along International Boulevard (see Figure 02). Thus, in conjunction with the key GHG reduction strategies under the transportation and land use focus of the dECAP, the potential TOD developments along International Boulevard is yet another good reason to explore parking policies that help limit GHGs.

Parking reform plays a key role because it can potentially increase local revenue through expanded business and development. As this report illustrates, there are many effective ways to manage parking, and the methods are suitable for all types of communities ranging from small town to major urban centers. Modified or updated parking policies are not only critical for reducing carbon emission, but they can be instrumental in helping to create successful infill, compact, or TODs that encourage walking, bicycling, and the use of transit. Thus, parking policies that espouse smart growth offer community members with more choices of alternative travel and healthier lifestyles.

The remaining of the report discusses the following.

- Evolution of development patterns on the American landscape.
- Significance and impacts of parking policies.
- Oakland’s existing off-street parking policies (at TODs), followed by an analysis that identifies the gap between Oakland’s actual and desired conditions.
- Innovative policies and strategies adopted by other progressive cities coupled with best practices.
- And finally, the report culminates by offering off-street TOD parking recommendations that may help the City of Oakland realize dECAP’s goal of reducing GHGs.
Figure 02: International Boulevard
Source: Bing.com
WHY PARKING MATTERS

Among all of the current urban planning topics, parking is arguably the least discussed. Despite its pervasiveness, seldom is parking given the attention it deserves, especially in the context of climate change and carbon emissions. In order to fully understand why parking is significant, it is best to share some of its history and background.

There is a reason why most parking is “free.” During the early part of the 20th century, only the wealthy owned automobiles. At that time, the curb served as a free place for parking vehicles. As the automobile became more affordable for the “common man,” parking became an issue. The growing number of automobile owners experienced great difficulty in finding curbside parking. Consequently, cities introduced off-street parking requirements in their zoning ordinances to combat the parking shortage. This was a good solution to the problem, or so it seemed at the time (Shoup D. C., 2005). Today, off-street parking requirements are in place to minimize spillover parking onto adjacent streets. They are also an attempt to maintain safe and efficient traffic movement by mandating a sufficient supply of off-street parking at the development site (Davidson, Dolnick, & American Planning Association, Parking Standards, 2002).

Although requiring new development to provide sufficient on-site parking solved the shortage of curbside parking, the solution produced new problems. Planners held an underlying assumption, which current trends show to be true, that individuals will use the automobile for all trips—work, shop, and play. Bearing that in mind, cities required each new site to provide its own parking areas where automobiles would park for free. In addition, the parking areas had to provide enough spaces to accommodate peak time demand. Thus, in his book, The High Cost of Free Parking, Donald Shoup argues that these on-site parking requirements encourage individuals to drive because parking is provided for free (Shoup D. C., 2005).

However, there is no such thing as “free” parking. Shoup claims that everyone pays for parking, including individuals who do not own or drive an automobile. Though the developer pays the cost for required parking spaces initially, the costs
transfer and trickle down to tenants or customers until they are fully diffused. Therefore, even though the parking costs are not paid in the way of the role of motorists, they are paid through all other roles (i.e., residents, workers, taxpayers, etc.). In this way, off-street parking requirements offer free parking to automobile users at everyone else’s expense (Shoup D. C., 2005; Shoup D, 2006; Victoria Transport Policy Institute, 2010).

On the other hand, as mentioned earlier, free curbside parking poses a problem even today. According to Shoup (2005), free curb parking is a commons problem. And when free curb parking is scarce, drivers will inevitably spend more time and waste fuel looking for parking. In the process of doing so, drivers pollute the air. Furthermore, when a resource is scarce and—free, individuals will not restrain themselves from using it. It then follows that once a free spot is secured, the individual has no incentive to give it up for another user, hence the problem of the commons (Shoup D. C., 2005).

When the cost, monetary, social, environmental or otherwise, of parking is masked behind the prices of other things, everyone has to pay for it. So, whether looking at free curb parking or free off-street parking, parking policies and requirements (or lack of) influence travel behavior, resource consumption, and the ways cities are shaped (Shoup D. C., 2005; U.S. Environmental Protection Agency, 2006; Wilbur Smith Associates (b), 2007).

THE STANDARDIZATION OF PARKING

Ever since the Village of Euclid, Ohio v. Ambler Realty Co., landmark decision, cities have used zoning as the predominate force to create guidelines, standards, and regulations within their jurisdiction. Zoning was and continues to be seen as the most fundamental and primary way of ensuring developments adhere to the regulations and objectives. As mentioned earlier, cities introduced off-street parking requirements in their zoning ordinances to ensure that parking was provided by new development. However, cities lacked a method for determining the amount of parking required by new development.
During the 1970s, the Institute of Transportation Engineers (ITE) conducted a large study to document parking standards and utilization in various developments (i.e., commercial, industrial, institutional, etc.) across the nation. The case studies relied on observational data gathered from a site during different hours of the day over the course of a year in order to determine maximum parking demand. Since most new development was taking place in the suburbs, and free parking was typical of those developments, pricing was not a factor, and thereby unaccounted. In 1976, ITE published the collected data in a reference guide, *Parking Generation*. This reference guide serves as the authoritative source for estimating parking demand. More importantly, because *Parking Generation* possesses extensive data, it is also used to form parking policies (Shoup D. C., 2005; U.S. Environmental Protection Agency, 2006; Wilbur Smith Associates, 2007; Metropolitan Area Planning Council, 2010; Davidson, Dolnick, & American Planning Association, Parking Standards, 2002). Therefore, it is important to point out that the connection between parking and land use/zoning was not made until the 1960s and 1970s (Wilbur Smith Associates, 2007).

**FACTORS THAT AFFECT PARKING COST & THE MONETARY COST OF INSTALLING PARKING SPACE**

Before discussing the new, more progressive parking policies and strategies that support smart growth, it is important to share the financial cost of parking. The discussion earlier regarding parking cost was to emphasize that although parking may be free, there is an actual cost that individuals, both motorists and non-motorists, pay for parking. The following section, however, looks at the factors that determine parking price.

Despite the dire need to reduce carbon emission by limiting vehicle trips, it is important to accept that parking is both important and necessary, at least for now and the foreseeable future. However, too much parking may prove costly. In addition, the amount and type of parking provided can have a substantial impact on development itself as well as the surrounding community.
According to a study conducted by the Environmental Protection Agency (2006) as well as the information shared by the Victoria Transport Policy Institute, the cost of parking revolves around three factors: 1) Number of parking spaces, 2) Opportunity cost of the land used for parking, and 3) cost per parking space (U.S. Environmental Protection Agency, 2006, p. 9; Victoria Transport Policy Institute, 2010). In terms of the number of parking spaces, if urban areas apply the same parking requirements and policies as suburban areas, they may unnecessarily increase the cost of development by assuming the need for large, surface parking lots or towering parking structures (Shoup D. C., 2005). The latter is more likely because of the limited amount of space in an urban setting, and it is also likely to be the more expensive option. Depending on the type of development, the opportunity cost of the land used for parking is the cost of not using it for a greater value or use. For instance, in the case of infill, compact, transit-oriented developments, the opportunity cost can be relatively high as each parking space limits the amount of commercial or residential space, which are not only valuable, but also essential for success of smart growth development.

Lastly, the cost of a parking space depends on the design and engineering aspects, which are usually governed by the specific site conditions. The conditions that determine the parking space cost may include, but are not limited to, the type of land, construction methods, and operation and maintenance needs. Because of the direct relationship between land and parking space cost, infill, compact, or transit-oriented developments will incur greater per-parking space costs than perhaps developments in areas with less density (Shoup D. C., 2005; Smith, 2005; Mukhija & Shoup, 2006; U.S. Environmental Protection Agency, 2006; Victoria Transport Policy Institute, 2009; Victoria Transport Policy Institute, 2010). Thus, this is another incentive for cities that are trying to encourage smart growth developments to reduce their parking requirements in order to better support smart growth development needs. Figure 03 shows how the cost of parking (cost per parking space) may vary depending on an area’s classification.
Figure 03: Parking Construction Cost Per Space & Area Classification
Source: “Parking Costs, Pricing and Revenue Calculator” (2007) by Todd Litman, Victoria Transport Policy Institute. For more detailed information on parking cost, please visit: www.vtpi.org/parking.xls
CHAPTER 3 WHAT’S ‘SMART’ ABOUT ‘SMART PARKING’ & WHY SHOULD IT REPLACE THE EXISTING PARADIGM

SMART GROWTH & PARKING

The history of urban planning presents a detailed account of various movements that visited the American landscape. Movements such as “The City Beautiful,” “The Garden City,” and “The City Functional” left deep impressions that not only carved the physical form of cities, but, as many argue, also influenced the American culture and way of life. However, it is probably safe to say that no other period has had as great of an impact in urban planning than the period following the Second World War. Post-WWII American development not only changed American ideals, but it created a sprawling spatial pattern that is now referred to as suburbanization.

For many years, the American public enjoyed the suburbanization period. But in recent decades, cities, and gradually the general public, have realized the challenges of continued expansion and sprawl. One of the biggest challenges is traffic congestion. The combination of an economy dependent on mobility and a nation with high automobile ownership has resulted in clogged roadways, which has significantly contributed to the increase in air pollution. Furthermore, additional concerns such as housing affordability, limited land supply, loss of open/green space, environmental injustice, and a sedentary culture have been linked to suburban life (Chavan, Peralta, & Steins, 2007).
As a result of these prevalent problems, planners and professionals from related fields are examining different ways to develop. One of these ways is through “smart growth.” Parris Glendening, former Maryland governor, coined the term “smart growth” (Woo, 2007). From a political standpoint, this was an incredibly clever way to market development. That aside, there is no clear definition to smart growth, but many accept that its tenets call for a rational process for development as opposed to mindless growth. However, there are times when the ambiguity is problematic. For example, on one end communities use smart growth to prevent new development whereas on the other end developers have used the smart growth card to their advantage in order to maximize profit (i.e., fitting more housing into typical subdivisions) (Chavan, Peralta, & Steins, 2007).

Despite the different interpretations and implementations, the basic principles of smart growth include efficiency, coordination between transportation, land use, and housing, compact developments, and a focus on transit, pedestrians, and bicyclists. These ideas are very nostalgic of development patterns from the late 19th and early 20th centuries. Essentially, the underlying idea of smart growth is to strike a balance between the need to grow—develop—and limiting the environmental impacts of that growth. By doing so, smart growth proponents believe growth can be tolerable, and even perhaps desirable (Woo, 2007).

Though smart growth gains rapid popularity among planners and local officials who are looking at ways to remedy the ramifications of conventional, suburban development, it is strongly opposed by others (i.e., market-oriented economists, well-established suburban communities) (Chavan, Peralta, & Steins, 2007). For instance, Wendell Cox, principle of an international public policy firm and consultant to the United States Department of Transportation, states that the “antisprawl diagnosis is flawed” (Woo, 2007, p. 10). He supports the statement on four pillars: 1) urbanization does not threaten agricultural land, 2) dispersal from the central city led to a very small percentage of suburban growth, 3) it is impractical to redesign low-density urban areas to support transit, and 4) large amounts of open space is protected (Cox, 2007). He explains these four points in an article titled “The Argument Against Smart Growth.”
The gist of Cox’s argument is that strict land use regulations limit affordable housing options. He goes onto mention that there are major urban areas with less stringent land use and zoning regulation that have been able to offer affordable housing options to their constituents. Cox believes the crux of smart growth should be about “people and their lives, not cities and how they look” (Cox, 2007, p. 17). It seems as though Cox fails to recognize that cities and the physical urban form (looks) directly affect people and their livelihood. Today, the ramifications of a auto-driven, vastly dispersed development pattern are seen in the form of a sedentary lifestyle that threatens the nation with obesity and other health problems. Nonetheless, there may be some truth to Cox’s argument about the connection between zoning regulations and affordability. Though grounded in different principles, smart growth proponents also push for zoning and code reform in order to direct investments and policies that encourage transit-first, compact developments.

There is a general consensus that current zoning practice presents many obstacles for smart growth developments. Out-dated zoning regulations not only limits options, but they may increase costs (Flint, 2007). Parking is probably the most notable part of a development that accrues significant cost and design limitation as a result of dated zoning requirements. In many cases, dated parking requirements may leave urban areas with vast, empty parking lots. Thus, conventional parking regulations may prevent smart growth developments that are both transit-friendly and compact from being built.
TODS & PARKING

Earlier it was explained that the City of Oakland has drafted an Energy and Climate Action Plan (dECAP) with the intention of reducing GHGs. Among copious other steps, one of the ways the City aims to lower GHG emissions is by modifying its parking policies. The objective of this study is two-fold. First, review how the City of Oakland regulates off-street parking related to developments, specifically TODs. And second, provide innovative off-street TOD parking policies that help reduce GHGs by examining what other cities are doing or have done and referring to best practices. The rationale is that before the City considers or initiates a process that involves reforming parking policies at the city-wide level, it may be beneficial to examine parking policies for certain areas first. TODs seem like a good place to start.

Like many fresh ideas and concepts, TODs required much promotion and advocacy when first introduced. Although the core principles of TODs were not new to America (19th century and early 20th century developments had similar characteristics), marketing the “contemporary” movement proved to have its challenges. But now, there is a greater understanding of TOD travel performance and travel outcomes. Moreover, the policy value of TOD is better understood, which has helped TOD become more acceptable and more importantly, a viable option for reducing GHGs (Cervero, et al., 2008). Figures 04 and 05 depict a spatial and design comparison between TODs and conventional development schemes.
TRANSLATION OF DEVELOPMENT PARKING POLICIES – STRATEGIES FOR LIMITING GREENHOUSE GASES

Chapter 3

What’s ‘Smart’ About Smart Parking & Why Should It Replace the Existing Paradigm

Figure 04: Conventional Development Design Scheme

Figure 05: Transit-Oriented Development Design Scheme
In relation to parking, an outstanding amount of research finds that TOD residents are twice as likely to not own an automobile (Boroski, Faulkner, Brinckeroff, & Arrington, 2002; Cervero, et al., 2008). And those TOD residents that own automobiles, own approximately half as many automobiles as compared to non-TOD residents. Studies have identified a number of reasons for the lower percentage of automobile ownership among TOD residents. One reason is that many of the residents have small households and therefore, they may not require an automobile or require fewer automobiles than larger households. Another reason is that TODs usually attract young professionals, especially those working in “creative” fields (architecture, computer science, etc.), who are more inclined to use transit (Boroski, Faulkner, Brinckeroff, & Arrington, 2002; Cervero, et al., 2008).

In addition to the large amount of research on the benefits and challenges of TODs, a number of different agencies, government, academic, and private, are now more interested in conducting field studies and developing research regarding parking at TODs. The primary concern is to determine whether or not parking is over-supplied at these sites. In a study put out by the Transportation Research Board (Cervero, et al., 2008), it was found that parking provisions do in fact influence travel behavior. Typically, TOD sites that offer abundant parking may also generate more vehicle trips (Cervero, et al., 2008). Also, a major demonstration project put on by the 1000 Friends of Oregon called “Making the Land Use, Transportation, and Air Quality Connection (LUTRAQ), evaluated the differences between suburban developments and TODs in the Portland metropolitan area. Based on their study, it was found that TODs could not only reduce household vehicle trips, but they could also reduce auto ownership by 4 percent (Davidson, Dolnick, & American Planning Association, Parking Standards, 2002).

Furthermore, another study, “Are TODs Over-Parked” (Cervero, Adkins, & Sullivan, 2009), surveyed 31 multi-family housing projects near transit stations in Metro Portland, Oregon and the East Bay (San Francisco Bay Area) to test whether parking is over-supplied. In general, the study’s results showed that parking supply exceeded peak demand by 30% in Metro Portland and 25% in the East Bay.
These studies also indicated TOD size (scale) and their distance from transit stations were important factors that influenced travel behavior. For instance, it was estimated that peak parking increased by 0.7 cars per dwelling unit for every 1000 feet of walking distance that a TOD site lies from a transit station (Cervero, Adkins, & Sullivan, 2009). From the study, it can be inferred that typically, larger-scale multifamily housing or TOD developments that provide ample parking and that are located relatively far from a transit station will experience high levels of peak parking. Meanwhile, TODs that offer a variety of uses with the “right” amount of parking, and relatively short and direct access to transit station(s), experience lower peak parking levels (Cervero, Adkins, & Sullivan, 2009). Thus, presumably under the “right” conditions, TODs have a strong chance of limiting automobile usage, and therefore, the need to own an automobile. By this logic, the combination of an adequate supply of parking, mixed-uses, and direct access to transit is a reasonable formula for reducing GHGs.

Based on the findings in studies like the ones mentioned above, it becomes clear that TODs present a good opportunity to reduce the amount of on-site parking provided and thereby, further help limit GHGs. The variety of land uses, transit proximity and accessibility, emphasis on pedestrians and bicyclists, and density are all factors which make the opportunity to reduce on-site parking more salient. However, limiting parking can be an incredibly controversial issue, and hence politically-challenged. Concerned about spillover, congestion, and the effects of traffic on neighboring areas, planners, traffic engineers, and other local officials usually require more parking than what may be necessary (Non-Profit Housing Association of Northern California (NPH), 2001).

The concern is legitimate, but disregarding the development type and location may be counterproductive. Requiring new developments to supply ample parking may not be the best strategy to tackle the potential threats of limited parking supply. In fact, such an approach may exacerbate traffic-

---

1 Here, “peak parking” hours are considered 12AM-6AM as defined by Robert Cervero, Arlie Adkins, and Cathleen Sullivan in their study “Are TODs Over-Parked?” (2009).

2 Here, “right” is quoted because there is not a definite numerical value for how much parking should be provided. The “right” amount of parking may differ from place to place. Thus, this is an implication that cities should conduct local parking demand surveys to understand how much parking ought to be provided (as explained later).
related problems, not necessarily limit them. The underlying problem may be based on an assumption—or rather fear—that if there is a shortage of parking, there will be a tremendous outcry from the community.

One way to clear that assumption and calm such fear is to better understand local demand. This may require a break from conventional practice. That is, instead of relying on the holy grail of parking requirements (i.e., Parking Generation), cities will have to determine how much parking ought to be provided based on their local conditions (demographics, development type, community need, proximity to other travel modes, etc.). Although understanding local demand requires more resources and perhaps higher financial costs, it is likely to generate greater long-term benefits.

Going into the second decade of the 21st century, cities must accept that half-century-old parking policies and regulation methods require reform, or at least an assessment. Conventional parking requirements at TODs have proven to increase costs, making housing even more unaffordable (Non-Profit Housing Association of Northern California (NPH), 2001; Cervero, et al., 2008). Poor circulation and urban form, inefficient use of space, traffic congestion, and the subpar use of public transit are other consequences of over-supplied parking. Moreover, with the advent of movements such as new urbanism and smart growth, it is necessary to re-evaluate current parking policies and practice. In addition, in a Wall Street Journal article titled “No McMansions for Millennials,” S. Mitra Kalita and Robbie Whelan report that younger generations have different housing preferences and living conditions than those preferred by their parents. The authors explain that “Gen Y,” defined by individuals who were born between 1980 and the early 2000s, prefer smaller houses, without the giant yards (even though outdoor and open space is valued among them), and less dependence on the car (Kalita & Whelan, 2011). With that being said, it is almost inevitable that these new housing and lifestyle preferences are subject to—or at minimum provide strong reason to—change how cities deal with parking.
CHAPTER 4 METHODOLOGY

This report explores parking policies that support TODs and limits vehicle trips in order to limit GHGs. The identified innovative parking policies are presented as options for modifying, refining, or replacing conventional parking policies. The first part of the report focused on research and involved visits to three TOD sites in Oakland to document what innovative parking policies, if any, have been applied or considered in the past. The second part focused on local legislation. The City of Oakland’s General Plan and Zoning Code were consulted to evaluate the current off-street parking policies. Moreover, the report heavily relied on observations, windshield surveys, and informal interviews to conduct the analysis. And finally, the last section (recommendations) identifies progressive parking policies primarily through best practices suggested by a number of experts and leading government agencies.

CHAPTER 4 METHODOLOGY

SOURCES: EXISTING POLICY, SITE VISITS, & INTERVIEWS

This report used multiple research methods. First, three TOD sites: 1) Fruitvale Transit Village, 2) MacArthur Transit Village, and 3) International Boulevard, located in Oakland were selected for study. The objective was to note whether progressive parking strategies were implemented or considered for the respective projects. The site selection was based on an effort to capture three different scenarios: 1) complete and semi-mature TOD—Fruitvale Transit Village, 2) planned and under construction TOD—MacArthur Transit Village, and 3) TOD in the planning phase—International Boulevard. The rationale was that these three scenarios would help identity gaps and determine whether or not Oakland needs to modify, refine, or build on its TOD parking policies.
As part of the case studies, a parking utilization study was conducted at the Fruitvale TOD. The study was guided by recommendations provided by ITE's Parking Generation (2004) as well as tips provided by the Metropolitan Area Planning Council (2010). More detail on the parking utilization study can be found in the Fruitvale Transit Village section in Chapter 5. Since the other two TODs are incomplete, a parking utilization study did not take place for those sites. Nonetheless, studies of their existing conditions and parking surveys were consulted. This was also accompanied by observational studies and windshield surveys.

In addition to the case studies, existing parking policies for the City of Oakland were examined through research (i.e., City’s website, General Plan, Zoning Code) and conversations with City staff. The gathered information provided a general understanding of the current policies. Considering the study’s focus on TOD parking policies, the information also laid the groundwork for determining whether or not the City of Oakland holds the same standards and regulations for TODs as it does for other, standard developments. That is, information on existing policy helped answer questions such as: Does the City of Oakland strictly base parking requirements on building square footage, dwelling units, use(s), or a combination of these variables? and Does the City of Oakland practice the typical minimum parking requirements like most cities or does it allow for flexibility in parking?

Furthermore, informal interviews with city planners, developers—both private and non-profit—designers, business owners, and residents were conducted for further insight on parking issues. To note, this study was not confined to a particular problem or site in the City of Oakland. Rather, the purpose of this study was to explore some of the higher-level policy aspects of alternative parking options. Given that, relying on existing documents and best practices to determine the most appropriate options for future TOD developments in Oakland was essential.

In sum, the three-step process described above builds the analysis. First, the three case studies create an opportunity to examine the policy changes, if any, made from the existing TODs to those currently in the planning phase. Specifically, the parking utilization study at the Fruitvale TOD will show...
how policies unfold in actual projects. That is, how the environmental goals and well-intended policies materialize from paper to ground. Second, consulting the City’s General Plan, Zoning Code, and Staff provides good background and existing conditions to recognize gaps. And lastly, the informal interviews help capture the planner’s, the developer’s, the merchant’s, and the community member’s perception of unconventional parking policies, which is integral for decision-making.
CHAPTER 5 CASE STUDIES

PARKING POLICIES IN THE BAY AREA

Cities in the San Francisco Bay Area (Bay Area) use various measures, ranging from square footage to the number of seats provided, to determine parking space requirements. While some cities refer to ITE’s Parking Generation to establish parking requirements, most turn to their neighbors to either adopt or build on their set of regulations. According to a technical paper presented to MTC by Wilbur Smith Associates (2007), Bay Area cities do not have a singular source or scientific standard for creating their parking regulations (Wilbur Smith Associates, 2007). Figure 06 presents what Bay Area cities are doing.

With an increasing emphasis on environmental aspects, Bay Area cities are taking major steps to address climate change and comply with State legislation such as SB 375 and AB 32. It is not uncommon to find cities pushing to create pedestrian, bicyclist, and transit-friendly communities. At the same time, there is growing awareness among citizens that these smart growth or new urbanist developments not only offer convenient transit options, but they are also attractive places to live. However, parking is still a major barrier for many areas as it prevents communities from capturing the complete benefits of compact, mixed-use, transit-oriented developments.

Conventional parking policies, which provide free parking and facilitate the automobile, are an impediment for transit-supportive communities. Therefore, like Oakland, other cities in the Bay Area face the challenge of reprogramming or modifying parking polices to better accommodate the key
EXISTING BAY AREA PARKING POLICIES

The following parking requirements and policies were revealed based on a survey of 15 municipalities conducted by MTC:

- Much of the classic literature on parking is oriented towards free, auto-dependent suburban land uses.

- Cities seeking to develop new parking policies and programs have a number of technical resources available to them. However, many of the resources offer limited and confusing information for cities seeking to modify their parking requirements or to develop other parking management policies.

- Cities tend to copy the parking requirements adopted by their neighbors and other peer cities rather than invest the major effort required to develop requirement that are truly relevant to the city’s characteristics and goals.

- Most cities have a one-size-fits-all uniform parking requirement which covers the entire city. Parking requirements in these cities do not change with density and transit availability, which inhibits TOD in those areas which have good levels of transit access.

- Many Bay Area cities have already adopted policies and programs specifically designed to promote smart growth and TOD, but have not been able to implement these practices.

- Widely held concepts of land use and parking are hard to displace. Any successful effort to adopt progressive parking policies must address the numerous concerns of the various stakeholder groups and the political makers.

- Because many cities have already taken the steps to adopt progressive parking management policies and measures, the other cities can benefit directly from their experience. The perceived risks of being a pioneering community can be diminished through sharing of experiences and information.

Figure 06: Existing Bay Area Policies
elements of a sustainable community. Fortunately, some cities (i.e., Palo Alto, San Francisco, Berkeley) in the Bay Area and across the nation have already developed and implemented parking policies that support TODs (Wilbur Smith Associates (b), 2007). The following section presents three Oakland TOD cases studies. The case studies may help identify any policy gaps and determine if policy has changed between the development periods of the sites.

CASE STUDY 1: FRUITVALE TRANSIT VILLAGE

PROJECT OVERVIEW

In a bold effort to revitalize Fruitvale’s central business district, this 10-acre mixed-used project brings to life an existing BART station by replacing the on-grade parking lot with a bustling commercial, retail, and entertainment paseo of community-related uses. A number of smart growth design and land use concepts were implemented including infill development and development along transit corridors. –MVE & Partners

PROJECT DESCRIPTION (The Unity Council; Center for Housing Policy, 2008):

- Site—Oakland, Ca
- Built on former BART parking lots (Phase 1 completed in 2004, Phase 2 is in progress
- Residential
  - 47 mixed-income units
    - 37 market-rate units
    - 10 affordable units
- Community & Office
  - 114,000 square feet includes
    - Unity Council’s Headquarters
    - Senior Center
    - Head Start child development center
    - City of Oakland Public Library
    - Health Clinic (La Clinica de la Raza)
- Retail
  - 40,000 square feet
- Parking
  - 150 car parking garage within the buildings (plus a large parking structure for BART)
SITE CONTEXT

Supported by a diverse community, the Fruitvale District thrives as a multicultural commercial area. Nestled in Fruitvale District, the Fruitvale Transit Village is a four-acre TOD. Today, many view the Fruitvale Transit Village as the poster-child of TODs. The Fruitvale Transit Village is supported by a number of transportation options. The Fruitvale Bay Area Rapid Transit (BART) station is integrated into the site, which makes it a very convenient and appealing traveling mode. Interstate-880, a major freeway that runs north-south in the East Bay, lies to the west of the transit village (see Figures 07 & 08). An inter-modal transit hub carrying 10 local and regional bus lines also serves the site (Scully, 2005; The Unity Council, 2009). The Fruitvale Transit Village has received much acclaim for using public transit to revive and stimulate community development. The Fruitvale TOD is considered an exemplary model in so many different areas (i.e., community participation, collaboration, urban design) that it deserves a closer look. The following section spends some time discussing its unique history. There is value to this information; especially considering this report’s focus on parking and the impact it has on the community.
Figure 08: Fruitvale Transit Village Aerial
Source: Bing.com
BACKGROUND

Fruitvale, name given in the 1800s by German immigrants who arrived there and planted fruit orchards, is located a few miles south of downtown Oakland in the Fruitvale District (The Unity Council, 2009). Prior to World War II, Fruitvale was considered Oakland’s second downtown because of its strong economy. During the War a surge of factories poured into the Fruitvale area, which helped boost its economy to a greater degree. A large number of workers, mainly of Hispanic and African American decent, followed the factories to Fruitvale and settled into the neighborhood (Scully, 2005). With a booming economy and a rich mix of individuals, life in Fruitvale seemed promising. However, that would not be the case.

Fruitvale, and Oakland overall, faced a great deal of trials and tribulations during the post-WWII era. What was once a robust economy later suffered from an unexpected blow. The main reasons for the collapse were the “disappearance” of factories and the suburbanization of America. These drastic changes left a deep gouge in the local economy and Fruitvale quickly became one of Oakland’s poorest neighborhoods.

Fruitvale continued to decline during the 1960s and 1970s (Scully, 2005; The Unity Council, 2009). Also during this time, the construction of the Fruitvale BART station brought another change to the community. Unlike the economic changes resulting from disinvestment, BART’s presence altered the area’s physical form. For instance, buildings and homes were cleared to make way for BART’s elevated train system. In addition, enormous surface parking lots spread across the area, forcing the reconfiguration of streets (Scully, 2005). In essence, two major changes severely affected communities across the nation. The decentralization of cities manipulated the spatial pattern, spurring suburbanization in the background. Meanwhile, in the forefront, areas like Fruitvale witnessed the disruption of their urban form as
parking lots segregated the communities. Parking would prove to be a major determinant of Fruitvale’s fate.

In the 1990s, BART proposed to expand its parking facilities with an interest to attract more park-and-ride commuters. The proposal faced a great deal of opposition by local residents and business owners. Community members voiced their concerns by saying any additional amount of land dedicated towards parking may hinder the neighborhood’s commercial and housing potential. More importantly, more park-and-ride parking meant serving out-of-area commuters, not necessarily the locals. Instead, community members felt it would be more favorable to use transit to serve the local population. In the end, the community’s resolve proved beneficial. BART discarded its original plans and engaged in a conversation with the community to develop a new strategy for the area.

The collaboration between BART and the Fruitvale community members resulted in a plan that includes the development of a 20-acre site, which formally served for BART parking, centered around the Fruitvale BART station (Jacobson & Forsyth, 2008; The Unity Council, 2009).

**PARKING**

**BART Parking Requirements**

It seems as though parking issues have been deeply embedded into every aspect of the Fruitvale TOD. Parking was the core issue for the TOD project mainly because BART required one-to-one replacement policy. This meant that each surface spot taken away for the project development had to be replaced. As the project developer, the Unity Council, a community development corporation (CDC) established in 1964, was held responsible for finding funds to construct a new parking facility to supply the parking needed to satisfy BART’s requirement (U.S. Department of Transportation-Federal Highway Administration; The Unity Council, 2009). The multi-story parking structure sits west of the elevated Fruitvale BART station tracks (see Figures 09 & 10).
Off-Street Parking

Parking was not only a significant aspect in terms of meeting BART’s requirements, but it was also an important aspect in terms of meeting the requirements for the variety of uses on-site. An agreement was made between BART and the Unity Council that once BART’s parking structure was complete, all the parking needed for the Fruitvale Transit Village would follow suit. Figure 11 shows the amount of off-street parking provided (Phase 1) or to be provided (Phase 2) for the Fruitvale TOD.

Figure 09: Fruitvale BART Parking Structure
Source: Author
Figure 10: Fruitvale BART Parking Structure Context
Source: Bing.com
### Location Spaces

<table>
<thead>
<tr>
<th>Location</th>
<th>Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDC/Unity Council</td>
<td></td>
</tr>
<tr>
<td>Building A</td>
<td>72</td>
</tr>
<tr>
<td>Building B</td>
<td>78</td>
</tr>
<tr>
<td>Lot C</td>
<td>138</td>
</tr>
<tr>
<td>Phase II Lots (on future construction site)</td>
<td>550</td>
</tr>
<tr>
<td>Subtotal</td>
<td>838</td>
</tr>
<tr>
<td>BART Parking</td>
<td></td>
</tr>
<tr>
<td>Parking Garage</td>
<td>558</td>
</tr>
<tr>
<td>Derby Street Lot</td>
<td>223</td>
</tr>
<tr>
<td>Surface Spaces</td>
<td>28</td>
</tr>
<tr>
<td>Subtotal</td>
<td>809</td>
</tr>
<tr>
<td><strong>Total Currently Available Parking</strong></td>
<td>1647</td>
</tr>
</tbody>
</table>

*77 Lot C spaces have been given to BART as part of the long term plan

---

**Figure 11: Fruitvale Transit Village Parking Breakdown**

*Source: Unity Council*
The Unity Council also pushed that the City implement a “special transit village zoning overlay ordinance that would allow maximum flexibility in the required parking ratios for the private Transit Village Project” (Parker, 2002, p. 42). The City acted on that request and the special ordinance became effective in 1996. As a result, the Fruitvale TOD with the S-15 (see Figure 12) overlay zone requires no retail parking and reduces the residential parking to 0.5 space per unit versus the standard of 1 space per 200-900 square feet and 1.0 to 2.0 spaces respectively (Parker, 2002). In addition to automobile parking, the Fruitvale TOD includes a bicycle station that provides free “valet” (attended) bike parking, a unique feature that is widely used (The Unity Council, 2009).
PARKING UTILIZATION STUDY

A parking utilization study was conducted to assess whether the current amount of off-street parking, provided by Garages A and B (see Figures 13 & 14), at the Fruitvale TOD was adequate. In other words, the parking utilization helped gauge whether parking supply met parking demand.

The study partially used the methodology recommended by ITE’s Parking Generation (McCourt, 2004, pp. C6-C8) as well as use tips provided by the Metropolitan Area Planning Council (Metropolitan Area Planning Council, 2010). The main step consisted of observing and tracking parking demand on an hourly basis. Parking Generation (2004) and Metropolitan Area Planning Council (2010) recommend parking utilization observations be made during peak hours and various other times throughout the day. However, because the on-site parking (Garages A & B) is closed to non-residents between the hours of 7pm and 8am, parking demand was not observed during those hours (see Figure 15).
Figure 14: Inside Garage A
Source: Author

Figure 15: Garage Hours
Source: Author
The observational study was conducted in December. Given that December falls during the holiday season, the data collected may not be representative of the actual behaviors and patterns, which limits the study. Another major limitation was the limited access to the on-site parking facility. After speaking to the property manager, I was given permission to make observations for a limited amount of hours over a span of two days. Hence, the parking demand was observed during two weekdays: Wednesday and Thursday. These weekdays were chosen to avoid any holiday-related activities falling closer to the weekend. Additionally, Wednesdays and Thursdays are said to be better representatives of the typical workday as some individuals may take days off during the beginning or end of a working week (i.e., Mondays and Fridays). A summary of the parking utilization observations is provided in Figures 16a, 16b, 16c. Figures 16b and 16c depict the number of vehicles parked in Garages A & B during the respective hour of those days.

**Objective:**
To determine whether Fruitvale Transit Village’s existing on-site parking supply meets parking demand.

**Note:**
On-site parking closed to non-residents between the hours of 7pm-7am. Also, limited permission was provided by the property manager for making the observations. Moreover, during the days of the study, the garages did not operate for the full length of their usual business hours due to the holidays.

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>GARAGE A</th>
<th>GARAGE B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Automobile Parking Spaces</td>
<td>74*</td>
<td>74</td>
</tr>
<tr>
<td>Non-handicap Spaces</td>
<td>72</td>
<td>72</td>
</tr>
<tr>
<td>Handicap Spaces</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Reserved Spaces</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>Tandem/Valet Parking</td>
<td>0</td>
<td>31</td>
</tr>
<tr>
<td>Motorcycle Parking Spaces</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

* There are 72 marked parking spaces marked by a number. 2 parking spaces (handicap parking) are not marked by a number.

Figure 16a: Parking Utilization Study  
Source: Author
Figure 16b: Parking Utilization Study | December 22, 2010
Source: Author
Figure 16c: Parking Utilization Study | December 23, 2010

Source: Author
CASE STUDY 2: MACARTHUR TRANSIT VILLAGE

PROJECT OVERVIEW

The MacArthur transit village transforms 6.84 acres of land, primarily surface parking, into a vibrant and viable mixed-use transit center. The intent of the development is to bring together the essential critical mass of retail, housing, and community uses necessary to support a much-needed 24/7-neighborhood center. This is a major hub for the Bay Area transit system and is positioned to be a gateway to the City of Oakland. –MVE & Partners

PROJECT DESCRIPTION [approved and current programs as of 2010 (Community & Economic Development Agency-City of Oakland(c), 2010)]

- Site—Oakland, Ca
  - Project will be built on former BART parking lot
- Residential
  - 624 mixed-income units
    - 516 market-rate units
    - 108 affordable units
    - 5-6 stories in height

Figure 17: MacArthur Transit Village Rendering
Source: MVE-Institutional.com
• Commercial & Retail
  » 42,500 square feet
• Community Center & Child Care
  » 5,000 square feet
• Parking
  » BART Parking: 510 spaces
  » Non-BART Parking (Structured)
  » 150 car parking garage within the buildings (plus a large parking structure for BART)
    – Residential: 624 spaces in 4 buildings
    – Non-residential: 31 spaces
• Final Development Plan (FDP)
  » Phase 1 (2011-2012): Site development, infrastructure and garage
  » Phase 2 (2014-2016): 90 affordable housing units
  » Phase 3 (2014-2016): Community 1 — 205 market-rate housing units
  » Phase 4 (2019-2021): Community 2 — 155 market-rate housing units
  » Phase 5 (2021-2023): Community 3 — 174 market-rate housing units
• Current Process
  » Construction of FDP Phase 1 is scheduled to start First Quarter of 2011 (see Figure 18)

Figure 18: MacArthur Transit Village | Phase 1 Plan
Source: CEDA-City of Oakland (2010)
SITE CONTEXT

The proposed MacArthur TOD site is located directly in front of the MacArthur BART station in northern Oakland. Currently, it is the MacArthur BART Station parking lot, which provides 618 on-site parking spaces (see Appendix A). The site is bounded by 40th Street to the north, Telegraph Avenue to the east, West MacArthur Boulevard to the south, and State Route 24 to the west (see Figure 19). Based on this boundary, the block on Telegraph Avenue between West MacArthur Boulevard and 40th Street makes up the project area. The TOD site includes the BART parking lot, the BART plaza, Frontage Road between West MacArthur Boulevard and 40th Street, and seven privately owned parcels.

BACKGROUND

The MacArthur Transit Village project idea was conceived in 1993 (Community & Economic Development Agency-City of Oakland, 2008; Community & Economic Development Agency-City of Oakland(b), 2010). Through a collaborative planning process, the City of Oakland, BART, and business and community organizations surrounding the MacArthur Station gained public support to help with the planning and creation of the MacArthur Transit Village. After selecting a development team in 2004, the proposed MacArthur TOD underwent an environmental review process (CEQA). Meanwhile, BART officials were discussing an important policy. With the maturation of BART and its increase in ridership, BART stations such as MacArthur experienced high levels of peak period parking constraints. To grapple with the issue, BART staff recognized the need to evaluate various access modes to their stations. In 2005, the BART Board of Directors adopted a TOD policy that sought to create a better way to treat station access, one that would enhance TOD projects near their particular stations. To fulfill the goal, the policy recognizes the need for trade-offs between development and replacement parking (i.e., parking garages) based on individual cases. This policy is especially significant for TODs with strong potential for high-intensity development as well as TODs seeking to achieve both local and regional goals (Fehr & Peers, 2008).

According to a report produced by Fehr & Peers (2008), BART completed the Access BART project in 2006. Through the Access BART project, MacArthur BART Station was labeled as
an “Urban with Parking station” (Fehr & Peers, 2008). The label describes the MacArthur BART Station as a station with high ridership consisting of high levels of pedestrian, bicyclists, and transit access and includes a fully occupied parking lot during the mornings. Given the multiple forms of accessibility, BART showed interest to capitalize on the opportunity to further support and facilitate pedestrian, bicyclists, and transit access to the MacArthur Station by converting the station’s parking lot into a Transit Village. In an effort to shift from an auto-access focus to a non-auto access focus and categorize the MacArthur BART Station as an “Urban Station,” a number of off-street, transit-supportive policies have been considered for the MacArthur TOD. The following is a summary of the different off-street TOD parking policies (relevant to transit village residents, not necessarily BART) as explored by Fehr & Peers (2008). Also provided are comments on whether or not I agree with the proposed strategies.

**PROPOSED PARKING POLICIES & STRATEGIES**

- **Remote Parking Facilities**

  This option includes off-site or fringe parking facilities. Using aerial photographs and data gathered during site visits, Fehr & Peers (2008), found several potential remote parking sites. The sites include three churches: 1) Sacred Heart Church, 2) East Bay Church of Religious Science, and 3) Beebe Memorial Cathedral CME Church, all located within ¼ mile of the MacArthur BART Station (Fehr & Peers, 2008). These sites present a great opportunity for remote parking, especially because their peak use usually occurs on Sunday mornings. This leaves the sites’ parking lots relatively vacant during the typical weekday work hours. While this may be a good option for BART patrons, especially if parking fees are lower at the proposed remote sites, it may be inconvenient for the transit village residents who own an automobile. Nonetheless, there may be some residents who may not use their cars during the weekdays and therefore, may not take issue with remote parking given some
other incentive (i.e., reduced rent). The feasibility of this option heavily depends on the willingness and needs of residents. Moreover, the path(s) to and from the remote parking sites would have to be enhanced in order to support a pedestrian and bicyclist-friendly atmosphere.

- **Carsharing**

  This option involves a fleet of vehicles made available to members of a carsharing group. Members typically pay fees for insurance, fuel, and vehicle maintenance. The fees can be paid on either a per-hour or per mile basis. Currently, the MacArthur BART parking lot houses four spaces for carshare vehicles (Fehr & Peers, 2008). Carsharing is a great option for individuals that may not be able to afford an automobile. However, I question whether or not individuals who can afford a personal automobile will turn to this alternative. Rather than pay fees to “rent” a car, the latter population may choose to invest in purchasing their own. However, given the likeliness of a large percentage of residents who will self-select to live in TODs, carsharing may easily become widely used. For instance, a San Francisco-based study found that 90% of carshare program members were from households that had 0-1 vehicles. During the study’s second year, 29% of the members retired one or more of their vehicles. Overall, 21% of members reduced the amount of vehicles they owned (Shoup D. C., 2005).
While this option may not immediately appeal to a large population, it is a great policy option that serves the needs of an underserved population while addressing environmental goals aimed to reduce GHGs. The City of Oakland operates carsharing programs and given its experience with carsharing at the Fruitvale TOD and BART Station (see Figure 20), implementing this option seems beneficial. Moreover, the passage of AB 1817, which allows personal vehicles to join the network of carshare programs like ZipCar and CityCarShare, is another reason to strongly consider this policy. Since legislation went into effect at the onset of this year, the City should monitor the growth of this program.

Figure 20: Fruitvale CarShare Pod
Source: Author
Unbundled Parking

As mentioned throughout this report, the cost of parking is hidden within the rent or purchase price of a residential or commercial unit. One way to reveal the cost of parking is through unbundling. This option separates the cost of parking usually attached to building space (i.e., housing). I believe this to be the most fundamental parking policy because it puts a price on parking, which is essential for individuals to see in order to remove the misconception that parking is free. It is also a policy that would address a major equity issue by saving individuals who do not own an automobile the cost of parking that is normally attached to housing. Moreover, it is important to provide individuals with choices. If the cost of parking is made clear, individuals, mainly those on the verge of purchasing a vehicle, may choose not to own an automobile (Boroski, Faulkner, Brinckeroff, & Arrington, 2002; Wilbur Smith Associates (b), 2007; Metropolitan Transportation Commission, 2007; Willson, 2005; Shoup D. C., 2005).

CASE STUDY 3: INTERNATIONAL BOULEVARD TOD

BACKGROUND

International Boulevard, formally known as State Route 185 and East 14th Street until the 1990s, is a major corridor that runs north-south through the City of Oakland. In the past, it functioned as a major artery that connected the City by an electric railroad (streetcar) system that extended 14.7 miles. But this vibrant area underwent a drastic transformation after the post-World War II era. The proliferation of the automobile, the rapid construction of massive highways, and the federal subsidies for suburban development were all major factors responsible for the decline of streetcar neighborhoods like International Boulevard. Recently, however, there has been momentum to revitalize International Boulevard in an effort to bring back the character and life that the area once exuded. For example, the City’s Redevelopment Agency provides funding opportunities to improve targeted areas. As a complement to that, the City is also undergoing a rezoning process that supports and channels development in areas like International Boulevard (Community and Economic...
Development Agency-City of Oakland, 2011). Hopefully, the combination of these efforts will not only revives the area, but it will also create a unique thoroughfare that transmits the historically and culturally rich identity of the different neighborhoods along the corridor.

**PROPOSED PLAN**

In addition to the examples discussed above, the most recent effort for reviving International Boulevard revolves around a Bus Rapid Transit (BRT) system and a string of TODs. The City is heavily relying on TODs to support a planned BRT (see Figure 22), which completely covers International Boulevard and extends to multiple jurisdictions (i.e., Berkeley, San Leandro). This marriage between the proposed TOD areas and planned BRT is essential, mainly for the purpose of leveraging investment. The planned BRT is anticipated to bring millions of dollars in physical improvements to the actual street, whereas the proposed TOD plan (see Figure 23) is expected to restore many of the neighborhoods along the corridor and nearby areas. Together, the proposed TOD
plan and planned BRT not only provide a great opportunity to revitalize a major urban area, but they also present an opportunity for the City to create pedestrian, bicyclist, and transit-friendly livable communities while achieving the environmental goal of reducing GHGs mentioned in the City’s dECAP.

**PROPOSED OFF-STREET PARKING POLICIES & DESIGN RECOMMENDATIONS**

The International Boulevard TOD Plan explores many progressive parking policies. As a matter of fact, the *International Boulevard TOD Plan—Public Draft Report* (2011) (Report) emphasizes implementing policies that reduce parking footprint while ensuring an adequate supply of parking (see Figure 24). More notably, the International TOD Plan underscores the importance of parking design and configuration, an area usually overlooked. This is a notable difference between this site and the two discussed previously. Unlike Fruitvale and MacArthur, which are more compact developments around BART and mainly deal with parking through garages or parking structures, the International Boulevard TODs are distributed along the corridor and may
Figure 23: International Boulevard TOD & BRT Plan
Source: International Boulevard TOD Plan (2011)
A. Intent and Policy Statement:

Produce human-scaled buildings within an interconnected network of short blocks. Buildings activate the sidewalk with ground floors that accommodate commercial, civic or housing with service, civic or housing on upper floors. Individual buildings may vary in how they respond to and shape the streetscape while contributing to the intended physical context for the sub-area. A key aspect of site organization is to locate each building with at least its front lot boundary aligned with the adjacent street (public or private).

mainly require surface parking. For this reason, parking design and configuration are significant. The following is a summary of the proposed parking policies and design recommendations as discussed in *International Boulevard TOD Plan—Public Draft Report* (2011).
Policies

As mentioned, the *International Boulevard TOD Plan—Public Draft Report* (2011) focuses much of its attention on parking. The report also points out the need to provide appropriate amounts of parking while creating an environment that supports pedestrian, bicycle, and transit conditions. According to my site visits and windshield surveys, the existing off-street parking is not conducive to pedestrian, bicyclist, and transit-friendly environment. For instance, surface parking lots disrupt the continuity of the corridor in many areas, making it unpleasant and perhaps even unsafe for non-motorists to travel along the boulevard. The corridor also lacks wayfinding and “place of destination” elements. While it does provide bus shelters, the boulevard suffers from a poor streetscape. The roads do not identify places (i.e., sharrows) for bicyclists, nor are all crosswalks clearly marked. But, the wide sidewalks create an opportunity to add landscaping (i.e., trees) to cool the urban islands and provide shade for pedestrians as they traverse along the corridor. So, my observations stand by the goal of creating the conditions mentioned in the *International Boulevard TOD Plan—Public Draft Report* (2011). As such, majority of the policies recommended in the Report deal with off-street parking regulations, which is what this study is concerned with. The Report offers the following parking recommendations (Community and Economic Development Agency-City of Oakland, 2011):

- **S-15 Transit-Oriented Development Off-street Parking Regulations**

  This option suggests implementing regulations that are similar to the existing S-15 TOD zoning classification (also mentioned in the Fruitvale case study) for the proposed TODs along International Boulevard. Currently, the majority of the corridor falls under the C-28 Commercial Shopping District and C-40 Community Thoroughfare Commercial zoning classifications. Applying the S-15 overlay can significantly reduce off-street parking requirements for TODs along International Boulevard. I strongly support this recommendation, especially because the Fruitvale TOD is adjacent to the corridor and is a good example of an operational S-15 zone. Moreover, the high quality of existing and planned transit service...
(BRT) in the area strengthens the reason for expanding the S-15 zone throughout the corridor. Nonetheless, aspects of the S-15 overlay zone may need to be amended or modified to better fit the conditions of the area. Further analysis may help determine if such changes are necessary.

● **Conduct Parking Inventory**

Conducting a detailed inventory of parking lots on International Boulevard complements the S-15 zoning overlay recommendation. The study should document the location, supply, and utilization, among other important factors for existing off-street parking facilities in the corridor. ITE’s *Parking Generation* provides more detailed methods of conducting a parking inventory which the City can refer to. Please refer to Appendix B to see an example taken from ITE’s website—parking survey sheet.

● **Unbundling**

Like the MacArthur TOD parking study conducted by Fehr & Peers (2008), the *International Boulevard TOD Plan—Public Draft Report* (2011) recommends separating the sale or lease of parking from the actual development. This option pushes to create incentives that promote unbundling the price parking from purchasing price of building space. The conventional practice of bundling parking to building space may be counterproductive to encouraging individuals to decrease auto use in order to capitalize on the area’s transit services. In addition, bundling decreases affordability. Unlike the MacArthur TOD parking recommendations however, the International Boulevard TOD parking recommendations offer more detail and additional ideas. For example:

Additional components of such a policy might include: a system of tiered rates for ‘assigned’ and ‘unassigned’ (first-come, first-served) spaces; reduced rates for compact spaces; or ownership of parking by homeowners associations, which may then reduce fees for residents who do not use parking. (Community and Economic Development Agency-City of Oakland, 2011, pp. Appendix A-A5)
• **Carsharing**

Again, like the MacArthur TOD parking study conducted by Fehr & Peers (2008), the *International Boulevard TOD Plan—Public Draft Report* (2011) also recommends carsharing. Carsharing programs such as City CarShare and Zipcar can really facilitate this option. Currently, there is only one carshare pod in close proximity to International Boulevard. That pod is located at the Fruitvale BART Station (see Figure 25). According to the Report, the next closest carshare pods are located at Lake Merritt and Downtown Oakland (Community and Economic Development Agency-City of Oakland, 2011).

The proposed TOD locations and planned BRT present a suitable opportunity to include carsharing areas through the International Boulevard corridor. With the passage of AB 1871, this recommendation would be especially fruitful in areas that consist of households with multiple automobiles. However, according to American Fact Finder, the median household income around the International Boulevard corridor ranges between 32,000-34,000. From that statistic it can be inferred that most households probably do not own multiple vehicles (U.S. Census Bureau, 2011).

**Design**

As mentioned, the *International Boulevard TOD Plan—Public Draft Report* (2011) gives a lot of attention to design. The Fruitvale and MacArthur TODs are much more compact and served by BART. The International Boulevard TODs are scattered throughout the corridor and will be served by BRT. Given this scenario, it is anticipated that most of the provided parking will take form on surface lots. The Report illustrates four different types of TOD infill sties that address the design and layout of parking. Figures 26, 27, 28, and 29 describe and depict the different types.
Figure 25: CarShare Pod Proximity
Source: Author
**TOD INFILL SITE TYPE 1 (small)**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual lot fronting International Boulevard</td>
</tr>
<tr>
<td>50 to 70 feet wide, 110 to 140 feet in deep</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off-street parking should be minimized</td>
</tr>
<tr>
<td>Off-street parking in rear, perpendicular to International Boulevard</td>
</tr>
<tr>
<td>Off-street parking for residents</td>
</tr>
<tr>
<td>Rear services/access alley for parking</td>
</tr>
</tbody>
</table>


Figure 26: International Boulevard TOD Type 1
Source: International Boulevard TOD Plan (2011)
TOD INFILL SITE TYPE 2 (wide/shallow)

Characteristics
- Row of lots fronting International Boulevard
- 100 to 200 feet in wide, 110 to 140 feet deep

Parking
- Off-street parking should be minimized
- Off-street parking in rear, parallel to International Boulevard
- Off-street surface and/or in tuck-under parking for residents
- Access from International Boulevard for rear parking if shared with adjacent lot(s)


Figure 27: International Boulevard TOD Type 2
Source: International Boulevard TOD Plan (2011)
**TOD INFILL SITE TYPE 3 (wider/deeper)**

**Characteristics**
- Row of deeper lots fronting International Boulevard
- May include lots fronting neighborhood cross-streets

**Parking**
- Off-street parking should be minimized
- Off-street parking on podium, surface and/or in tuck-under parking for residents
- Rear services/access alley for parking


Figure 28: International Boulevard TOD Type 3
Source: International Boulevard TOD Plan (2011)
Transit-Oriented Development Parking Policies – Strategies for Limiting Greenhouse Gases

Characteristics
- Wider than type 2, deeper than type 3
- Broadest range of possibilities for TOD strategies

Parking
- Off-street parking on podium, surface and/or in tuck-under parking for residents
- Rear services/access alley for parking


Figure 29: International Boulevard TOD Type 4
Source: International Boulevard TOD Plan (2011)
CHAPTER 6 ANALYSIS

AN ASSESSMENT OF EXISTING TODS (CASE STUDIES) AND THE CITY’S GENERAL PLAN AND ZONING CODE

Since this report aims to examine parking policies at TODs, on-street issues such as metered parking, residential parking districts, etc. were not particularly relevant. Therefore, the real focus was on off-street parking requirements for new development. In addition to the three case studies (Fruitvale, MacArthur, and International Boulevard TODs) examined in the previous chapter, this chapter analyzes Oakland’s existing policies through its regulations. That being the case, the City of Oakland’s General Plan and Zoning Code were consulted to review existing off-street parking policies and standards.

The General Plan contains a number of policies regarding parking, but these policies are very general in nature for the most part. Essentially, the policies imbedded in the General Plan state that there should be sufficient parking for uses, and that parking should not be an eyesore. According to a City employee, the current policies within the General Plan are not exactly “groundbreaking.” The following are the parking policies pertinent to TODs as found under the “Transportation and Transit Oriented Development Section” in the Land Use and Transportation Element of the General Plan.
Policy T3.8 Screen Downtown Parking
» Cars parked in downtown lots should be screened from public view through the use of ground floor storefronts, parks, and landscaping, or other pedestrian, safe, and attractive means (Planning & Zoning-City of Oakland, 1998, p. 57).

Policy T3.9 Providing Parking for Transportation
» They City should strive to provide parking for multiple modes of transportation throughout the city where it is needed and does not unduly disrupt traffic flow (Planning & Zoning-City of Oakland, 1998, p. 57).

Policy T3.10 Balancing Parking Demands and Economic Development Activity
» The City should balance the parking demands and parking changes in City-owned facilities with the need to promote economic activity in certain areas (such as Downtown and neighborhood commercial areas) (Planning & Zoning-City of Oakland, 1998, p. 57).

Policy T3.11 Prioritizing Parking
» Parking in residential areas should give priority to adjacent residents (Planning & Zoning-City of Oakland, 1998, p. 57).
The General Plan also emphasizes the importance of having dynamic neighborhoods throughout the City. As such, the City calls for concentrated, pedestrian-friendly neighborhoods because of their potential to serve as commercial areas. The key aspect of these activity centers is the accessibility they offer to nearby residents. In order to encourage dynamic neighborhoods, the “Neighborhoods” section in the Land Use and Transportation Element of the General Plan states two policies that focus on parking. The two policies are:

- **Policy N1.3 Locating Parking Facilities**
  » Whenever feasible, and desired by merchants and residents, the City should construct strategically located, safe, and attractive parking facilities in Neighborhood Activity Centers. Use of in lieu fees, parking assessment districts, or other programs to pay for these facilities should be explored (Planning & Zoning-City of Oakland, 1998, p. 104).

- **Policy N3.10 Guiding the Development of Parking**
  » Off-street parking for residential buildings should be adequate in amount and conveniently located and laid out, but its visual prominence should be minimized (Planning & Zoning-City of Oakland, 1998, p. 108).

While the General Plan presents the parking policy framework, the zoning code provides further detail on parking requirements for various uses. Unfortunately, the zoning code has not yet been updated to reflect the General Plan. But, the updating process is underway and should be completed early this year (2011). Additionally, after speaking with a transportation planner from the City of Oakland, it was learned that the Planning Department has completed the land use update. However, the Planning Department is only now beginning to address parking requirements. Hence, it is possible that some of the parking requirements may be in conflict with the General Plan. But, given the vague nature of the General Plan statements, the discrepancies are likely to be minute.
Although the parking update will better represent the City’s vision as described in the General Plan, it is important to note that the General Plan is more than 10 years old. This may be a little concerning considering it is questionable whether the updated parking requirements in the zoning code will support current conditions, let alone initiate innovative policies. In other words, despite the updating process, the “new” parking requirements may do very little in terms of moving away from conventional parking requirements and regulations. Presently, the zoning code has an exhaustive set of parking policies. The off-street parking requirements can be found under Chapter 17.116 of the Zoning Code.

Based on the case studies, it is safe to say that the City of Oakland has already adopted many progressive parking policies and programs that foster smart growth developments like TODs. But, in some cases, the application of many of these policies remains to be seen. It is also important to note that this report is limited and may have overlooked cases where those policies may have been implemented.

Moreover, neither the general plan nor the zoning code does much to minimize parking requirements in transit-oriented locations. And, other than offering well-intended, but—vague statements about maximizing transit access and increasing opportunities for creating user-friendly environments, more work needs to be done in this regard. Given the City’s disconnect between parts of its General Plan and Zoning Code, there’s a large degree of uncertainty regarding what the City’s regulations mandates, encourages, and allows. Thus, one thing is clear, these internal logistical issues must be resolved in order to identify future policy gaps. Perhaps then, more assertive policies can be integrated in the City’s regulations. Overall, however, it seems as though the City of Oakland is taking the right cues from its neighbors and responsibly adjusting parking policies to meet community needs and pursue the environmental goals stated in the dECAP.
WHAT PLANNERS, DESIGNERS, DEVELOPERS, & COMMUNITY MEMBERS HAVE TO SAY ABOUT UNCONVENTIONAL TOD PARKING POLICIES

In addition to the case studies and reviewing the City’s General Plan and Zoning Code, conversations with city planners, developers—both private and non-profit—designers, business owners, and residents offered further insight on parking issues. Given the variety of individuals spoken to, it should be no surprise that their opinions and perceptions differed. The conversation tried to capture their views in order to understand some of the challenges progressive parking policies may face.

There is a general consensus among the planners and designers that unconventional parking policies such as flexible requirements and unbundling can encourage people to live “car-free lives.” But, they also believe that the degree to which they can influence individuals varies. Some of the professionals (i.e., planners from the cities of Oakland, Seattle, and Southern California Association of Governments (SCAG); partner from an architect firm) spoken to strongly recommend aspects such as parking management, particularly pricing, as a way to manage demand and influence travel choice.

Earlier it was mentioned that the City of Oakland is in the process of updating its Zoning Code and parking requirements to better meet its goals. After speaking with a planner from Seattle, I learned that the City of Seattle’s Department of Planning and Development (DPD) is also undergoing a similar process. For example, a recently passed regulation (Multifamily Code Update) includes a waiver of parking requirements for projects in growth areas and within ¼ mile of frequent transit service (15 minute headways), allowing the market to dictate the level of parking to provide. It also removes parking requirements for multifamily uses in urban villages for lots within walking distance of transit stops with frequent service, and eliminates the City’s authority to require more parking in these areas and certain urban centers through environmental review. This is similar to the City of Oakland’s S-15 transit overlay zone in many ways.
Planners seeking to encourage alternative modes of travel or satisfy environmental goals appreciate progressive parking policies. Also, designers are happy to see such provisions in place because innovative policies help build a more integrated development/space, whereas conventional parking requirements limit design and fragment urban form. However, not everyone embraces these progressive policies.

Even though some studies find that developers prefer parking reductions because it saves costs, a couple of developers spoken to for this study felt otherwise. For instance, a Unity Council (non-profit developer) executive regrets not having additional parking at the Fruitvale TOD. This was an unexpected statement especially because the main impetus behind the Fruitvale TOD was the community’s opposition for additional parking (see Fruitvale TOD case study in Chapter 5). When the project was unveiled in 2004, a huge part of its success was attributed to the site’s parking strategies. Now, however, the developer feels there is a shortage of parking. But, the developer’s concern about parking shortage is based on peak time demand for a particular use (i.e., morning drop-off at day care). Peak time demand alone should not warrant additional parking. Furthermore, the data gathered from the Fruitvale TOD parking utilization study does not indicate lack of supplied parking.

Also, The MacArthur TOD developer argued for increased parking ratios (as oppose to the S-15 ratios), even before the project broke ground. For the MacArthur Transit Village, the developer initially wanted 1.25 spaces per unit but the City was eventually able to convince them that 1 space per unit would be more than sufficient.

It seems that some developers have reservations about unconventional parking policies out of concern that lenders will not finance projects if they feel the on-site parking is insufficient. There is a fear the units or space will not sell if users do not have a guaranteed place to park their vehicles. Other groups also share the fear of reduced parking, but for different reasons.
Surrounding neighbors are often concerned about spillover impacts on their streets if a project provides a low parking ratio. Merchants in commercial districts are well organized and raise concerns about increased meter prices, reduced parking ratios, etc. It is evident that certain groups are passionate about having plentiful parking. There is a sense of ownership around it, and so a political challenge often follows suit. Thus, this shared fear (perceived or otherwise) among some developers and community members may be a major impediment to implementing unconventional policies. But, this should not discourage an effort to consider and discuss unconventional parking policies with stakeholders.

Some developers (i.e., Five Point Communities) push for innovative parking standards when feasible, sometimes even under financially challenging circumstances or even when the marketability of projects seems risky. Similarly, business owners in parts of Long Beach, Ca worked with the City to convert parking spaces for bicycle parking in order to carry out the City’s “Bike Long Beach” vision. As a result of their efforts and addition of elements such as demarcated bike lanes along the streets by the City, the number of bicyclists increased. Today, there are fewer automobiles clogging the roads in that part of the community as some commuters have opted to ride their bicycles. This shared vision has not only created a healthier lifestyle, but it has also improved the overall environment. Therefore, even though innovative policies may draw some tension or may be completely rejected, they are still worth exploring.

LESSONS LEARNED

Parking goals can easily get convoluted. There are simply too many aspects that are either linked to or intertwined with parking which makes it difficult to account for a policy’s consequence(s). From an environmental standpoint, decision and policy makers must first answer an underlying question when it comes to parking reform: Is the goal to control automobile ownership or automobile trips (GHGs)? The former is not only politically challenging, but may be impossible to administer. The latter however seems to be more promising and feasible.
The lesson here is that good policy may not always be well received by the affected public, no matter how sustainable and environmentally friendly it may be. Often, under the guise of TODs or carbon reduction strategies, developers will reduce parking with the expectation that residents will assimilate into the “green lifestyle” by turning to alternative traveling modes. Good public policy drives individual change-of-habit is a common belief. But, that may not always the case, and the results of good policy may only be partially true. Sometimes, the product can be an under-parked project that will have unintended consequences for the residents and adjacent street parking. Therefore, as a method for reducing GHGs, it is essential that parking reform be coupled with strategic development placement.

Overall, there is good reason to believe individuals will continue to own automobiles. And MTC’s (Planning Section-Metropolitan Transportation Commission, 2008) data for regional projections for the year 2035 supports this belief (see Appendix C). Nonetheless, individual attitude towards public transit has gradually changed, and as time passes, their behaviors will reflect their newfound attitude. Transportation choice may defer to public transit as Gen Y replaces the Baby Boomers. And even though automobiles may be less used in the future, they will still require a parking space. Thus, providing an adequate amount of parking to meet automobile owners’ demand in ways that limit the impacts on the environment will be key. Opposition towards innovative initiatives and progressive practices may steadily subside as unconventional parking policies become ubiquitous. The success of innovative parking policy relies on a combination of things, primarily political will, community support, and collaboration between the city, developer, and lender. Given the need to change the manner in which parking is addressed for environmental, livability, and equity reasons, cities should create and push for innovative policies, but they should proceed with caution—bearing in mind the community’s vision, goals, and needs.
Most of the progressive parking policies discussed in this report are sensitive to market conditions. Other than those parking policies that explicitly deal with only design, nearly all parking policies call for parking space reduction, which presumably caters to today’s conditions versus conventional parking standards that may hinder current needs and goals. There is no magical formula for generating the “right” amount of parking. The best approach to providing adequate—meets the need but is not oversupplied—amount of parking may only come with a site-specific demand study. Even then, it should be kept in mind that circumstances might change, in which case the demand might change.

The following section presents progressive parking policies that are best practices. Though there are over two-dozen progressive parking policies (see Appendix D), only those most applicable to off-street TOD parking are shared. Moreover, there is considerable overlap between the best practices identified by experts and leading government agencies and those that the City of Oakland already implements or is currently considering (i.e., transit-overlay zone, unbundling, carshare, etc.). This reaffirms that the City is moving in the right direction. Nonetheless, there are several policies that the City may not be familiar with worth exploring. Although some overlap is inevitable, most of the best practices identified below are based on the aforementioned considerations.

Moreover, without having conducted community input workshops, technical studies, and a cost-benefit analysis, all of which are sensitive to the actual project location, it is difficult to determine which parking polices would best serve
the community. Nevertheless, I created a simple marker, based on existing literature, expert opinion, and conversations with professionals, to indicate my assessment. The marker provides a feasibility measure that considers political, economic, and design challenges (see graphic and description below). Hopefully, this provides a general sense regarding the degree of difficulty for implementation. The best practices are followed by more general recommendations.

**BEST PRACTICES**

- **Landscaped Parking Reserves**

One of the major points this study makes is that parking demand is not only difficult to determine, but it can also change with time. One way to address this uncertainty is through landbanking. The City can either require or allow, depending on the goals and market conditions, developers to reduce the amount of paved parking spaces provided, but reserve land for additional spaces in the event more parking is needed. The reserved land can be landscaped or it can be used to provide other amenities (i.e., pocket parks) until the area is needed for additional parking. As long as the additional parking is not needed, the land can be landscaped or used to provide other valuable amenities such as a playground or park. This option balances the needs of business owners/residents, developers, and the environment (i.e., limits the urban heat island effect, absorbs carbon dioxide, reduces pollutants emitted by vehicles and...
stromwater runoff) (Zimbler, 2006). This strategy has been implemented throughout many cities. The City of Palo Alto “allows reductions of up to 50 percent in minimum parking requirements provided that the difference is made up through a landscape reserve” (Forinash, Millard-Ball, Dougherty, & Tumlin, 2003, p. 5). Interestingly, none of the landscaped reserves have been used for additional parking since their respective developments (Forinash, Millard-Ball, Dougherty, & Tumlin, 2003; Metropolitan Area Planning Council, 2010).

- **Reduced Stall Dimensions**

Reducing parking stall dimensions (i.e., compact spaces) is another way to limit GHGs generated by parking. Although this option will not reduce GHGs significantly, reducing impervious surfaces across all new developments may aggregate to considerable GHG reductions. Therefore, when other options are limited, reducing stall dimensions is an effective way to minimize parking lot footprint (Zimbler, 2006).

- **Tandem Parking**

Another way to reduce parking footprint is by requiring parking spaces in tandem or stacked parking arrangements. This option works especially well if an attendant is present to move vehicles as needed (valet parking) (Zimbler, 2006). But, having an attendant may add cost to the project. The Fruitvale TOD implements this strategy and it seems to be working well. It has 32 tandem parking spots that are monitored by an attendant. It may be helpful for the City of Oakland to implement this policy at future TODs.

- **Alternative Paving Materials**

Alternative paving material is a great way to reduce the urban heat island effect and stormwater runoff. Often time, these “quieter” options are overlooked and become a missed opportunity for not only helping to reduce GHGs, but also enhance the attractiveness and liveliness of a space. Given the
advances in technology, there are many types of such pavers and materials made available today. Some of them include: pervious concrete, porous asphalt, turf blocks, natural stone, brick, and grass pavers. The specific-site conditions and other regulations (i.e., Fire Department) should determine the type of material used.

RECOMMENDATIONS

ESTABLISH CLEAR COMMUNICATION

One of the biggest challenges of parking and transportation is communication. The ability to simplify data into a crisp story that resonates with the average individual can be an ongoing struggle. One way to inform and educate the public about parking policies is through social media sites like Facebook. Facebook can serve as a great tool for posting information regarding meeting and workshops as well as receiving community feedback. Though the public may not always agree with the City’s initiative for implementing progressive ideas, the online forums provide an opportunity to built good working relationships.
MEET DEVELOPERS & LENDERS

Cities cannot just regulate change and expect it to be workable. It is necessary to work closely with developers to set the policies. Developers are often restricted by what can be financed, especially in the current market where financing is hard to come by. For these reasons, it is important to meet with developers and lenders to explain and discuss the City’s rationale for adopting unconventional parking policies.

BORROW PRACTICES

This is a popular method currently used by the City and other Bay Area cities and should continue. Although earlier segments of this report may have implied “borrowing” to be a sin, there is no harm in taking cues from neighbors and friends across the area as long as it is done with discretion.

Borrowing ideas and practices from other jurisdictions without the complete consideration of local aspects—political environment and challenges, the City’s General Plan and goals, State legislations, socioeconomic conditions, etc.—can be detrimental (Davidson, Dolnick, & American Planning Association, Parking Standards, 2002). Thus, borrow what is suitable to the community.
INCENTIVIZE GOOD DESIGN

Although there are a dozen methods and solutions to reduce vehicle trips using parking policy, little is offered in the way of parking design. I believe parking design needs to be considered and better studied to help meet parking needs and at the same time, minimize the amount of space used for parking. It is common for policies to overshadow design. But, planners should remain cognizant of the value of design, especially when it can supplement progressive policies. In many instances, cities may inadvertently inhibit innovative design through archaic standards. The outdated standards may also make compliance more difficult than needed. Consequently, developers may be discouraged from building a creative project out of fear that their proposal will have to endure an extensive approval process, at the end of which their project is likely to get rejected anyhow. Developers are well aware of the high cost of parking facilities and, thus, will want to maximize profitability through innovative design strategies that result in greater floor area ratio (FAR) (Forinash, Millard-Ball, Dougherty, & Tumlin, 2003; Zimbler, 2006). Therefore, incentivizing and supporting creative design backed by innovative policies not only ensures a quality project, but it also helps achieve environmental goals.

CONDUCT PROJECT-SPECIFIC STUDIES

This is probably the most effective method for capturing demand, but it is also the most resource demanding. There needs to be sufficient amount of staff and time available to conduct a quality project-by-project parking study. Usually, when internal resources are limited, a consultant team is hired to conduct the parking studies instead. While this may be a good alternative, it is important to bear in mind that consultants may not be familiar with the community or its long-term goals and vision.
CLOSING THOUGHTS

Current literature on parking states that an over supply of parking dampens the potential for alternative modes of travel. Beyond its direct connection to transportation, excessive amounts of parking supply increase development cost, which then drives up other costs (i.e., housing). Affordability gets lost in that equation fairly quickly. In addition to the social costs, over-supplied parking presents an environmental cost. Giant parking lots cause the urban-island heat effect, trap pollutants which join major water bodies through stormwater runoff, threaten the natural environment, and induce automobile travel, a major contributor to air pollution. Moreover, the massive asphalt blankets covering the cities distort the urban form.

But, the automobile, being an emblem of freedom and privacy, is strong part of American culture. Replacing it is nearly impossible. I would argue those who can afford to own an automobile will continue to do so. Smart growth and new urbanism philosophies may inspire individuals to use public transit as the “green” movement continues to proliferate, but there is little reason to believe public transit and other alternative travel modes will completely replace the automobile. As long as that is the case, parking policies will need to be monitored carefully, applied mindfully, and modified periodically.
REFERENCES


APPENDICES
APPENDIX A

Source: Fehr & Peers (2008). MacArthur BART Station Access Feasibility Study (pg. 72)
# Appendix B

**Parking Demand Survey Form**

Institute of Transportation Engineers

*All in all highlighted cells - * are required data*

<table>
<thead>
<tr>
<th>Land Use Code*</th>
<th>Name of Site</th>
<th>Brief Description of Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transit*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area*</td>
<td>City</td>
<td>State</td>
</tr>
<tr>
<td>TMP*</td>
<td>Daily Rate</td>
<td>$</td>
</tr>
<tr>
<td>Parking Price*</td>
<td></td>
<td>$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Size*</th>
<th>Units*</th>
<th>Occupancy*</th>
<th>Land Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Size</td>
<td>Units</td>
<td>Occupancy</td>
<td></td>
</tr>
<tr>
<td>Site Size</td>
<td>Units</td>
<td>Occupancy</td>
<td></td>
</tr>
<tr>
<td>Site Size</td>
<td>Units</td>
<td>Occupancy</td>
<td></td>
</tr>
</tbody>
</table>

Number of Parking Spaces Provided at Site

<table>
<thead>
<tr>
<th>Highest Observed Parking Demand for the following hours of the day (hour beginning)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
</tr>
<tr>
<td>12 Mid</td>
</tr>
<tr>
<td>1:00 AM</td>
</tr>
<tr>
<td>2:00 AM</td>
</tr>
<tr>
<td>3:00 AM</td>
</tr>
<tr>
<td>4:00 AM</td>
</tr>
<tr>
<td>5:00 AM</td>
</tr>
<tr>
<td>6:00 AM</td>
</tr>
<tr>
<td>7:00 AM</td>
</tr>
<tr>
<td>8:00 AM</td>
</tr>
<tr>
<td>9:00 AM</td>
</tr>
<tr>
<td>10:00 AM</td>
</tr>
<tr>
<td>11:00 AM</td>
</tr>
<tr>
<td>12 Noon</td>
</tr>
<tr>
<td>1:00 PM</td>
</tr>
<tr>
<td>2:00 PM</td>
</tr>
<tr>
<td>3:00 PM</td>
</tr>
<tr>
<td>4:00 PM</td>
</tr>
<tr>
<td>5:00 PM</td>
</tr>
<tr>
<td>6:00 PM</td>
</tr>
<tr>
<td>7:00 PM</td>
</tr>
<tr>
<td>8:00 PM</td>
</tr>
<tr>
<td>9:00 PM</td>
</tr>
<tr>
<td>10:00 PM</td>
</tr>
<tr>
<td>11:00 PM</td>
</tr>
</tbody>
</table>

Person

Phone
Fax
Email

Notes

Enter data on the web at [www.ite.org](http://www.ite.org)
Comments to: iae_staff@ite.org

Institute of Transportation Engineers, 1527 Eye Street, NW, Suite 620, Washington, DC 20006

Form version 1.4

Source: Institute of Transportation Engineers (2010)
http://www.ite.org/parkgen/datasubmission.asp
### Table A.6 (continued)

**Household Vehicle Availability Forecasts by Bay Area County**

MTC Forecasts based on ABAG Projections 2007

<table>
<thead>
<tr>
<th>County</th>
<th>Year 2000</th>
<th>Year 2006</th>
<th>Year 2010</th>
<th>Year 2015</th>
<th>Year 2020</th>
<th>Year 2025</th>
<th>Year 2030</th>
<th>Year 2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alameda</td>
<td>1.69</td>
<td>1.74</td>
<td>1.74</td>
<td>1.73</td>
<td>1.72</td>
<td>1.71</td>
<td>1.70</td>
<td>1.71</td>
</tr>
<tr>
<td>Contra Costa</td>
<td>1.87</td>
<td>1.94</td>
<td>1.95</td>
<td>1.95</td>
<td>1.96</td>
<td>1.96</td>
<td>1.95</td>
<td>1.96</td>
</tr>
<tr>
<td>Marin</td>
<td>1.78</td>
<td>1.78</td>
<td>1.79</td>
<td>1.79</td>
<td>1.79</td>
<td>1.79</td>
<td>1.79</td>
<td>1.80</td>
</tr>
<tr>
<td>Napa</td>
<td>1.87</td>
<td>1.92</td>
<td>1.93</td>
<td>1.94</td>
<td>1.94</td>
<td>1.95</td>
<td>1.96</td>
<td>1.98</td>
</tr>
<tr>
<td>San Francisco</td>
<td>1.13</td>
<td>1.10</td>
<td>1.10</td>
<td>1.10</td>
<td>1.11</td>
<td>1.11</td>
<td>1.11</td>
<td>1.13</td>
</tr>
<tr>
<td>San Mateo</td>
<td>1.87</td>
<td>1.90</td>
<td>1.90</td>
<td>1.90</td>
<td>1.89</td>
<td>1.88</td>
<td>1.86</td>
<td>1.87</td>
</tr>
<tr>
<td>Santa Clara</td>
<td>1.96</td>
<td>1.96</td>
<td>1.97</td>
<td>1.96</td>
<td>1.95</td>
<td>1.95</td>
<td>1.94</td>
<td>1.94</td>
</tr>
<tr>
<td>Solano</td>
<td>1.94</td>
<td>1.98</td>
<td>2.00</td>
<td>2.03</td>
<td>2.03</td>
<td>2.05</td>
<td>2.06</td>
<td>2.06</td>
</tr>
<tr>
<td>Sonoma</td>
<td>1.89</td>
<td>1.96</td>
<td>1.96</td>
<td>1.96</td>
<td>1.96</td>
<td>1.96</td>
<td>1.97</td>
<td>1.99</td>
</tr>
<tr>
<td>Bay Area</td>
<td>1.75</td>
<td>1.78</td>
<td>1.79</td>
<td>1.79</td>
<td>1.79</td>
<td>1.79</td>
<td>1.79</td>
<td>1.80</td>
</tr>
</tbody>
</table>

Source: Metropolitan Transportation Commission–Planning Section (2008). Travel Forecasts Data Summary: Transportation 2035 Plan for San Francisco Bay Area
### APPENDIX D

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Description</th>
<th>Typical Reduction</th>
<th>Traffic Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared Parking</td>
<td>Parking spaces serve multiple users and destinations.</td>
<td>10-30%</td>
<td></td>
</tr>
<tr>
<td>Parking Regulations</td>
<td>Regulations favor higher-value uses such as service vehicles, deliveries,</td>
<td>10-30%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>customers, quick errands, and people with special needs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More Accurate and Flexible</td>
<td>Adjust parking standards to more accurately reflect demand in a</td>
<td>10-30%</td>
<td></td>
</tr>
<tr>
<td>Standards</td>
<td>particular situation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parking Maximums</td>
<td>Establish maximum parking standards.</td>
<td>10-30%</td>
<td></td>
</tr>
<tr>
<td>Remote Parking</td>
<td>Provide off-site or urban fringe parking facilities.</td>
<td>10-30%</td>
<td></td>
</tr>
<tr>
<td>Smart Growth</td>
<td>Encourage more compact, mixed, multi-modal development to allow more</td>
<td>10-30%</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>parking sharing and use of alternative modes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking and Cycling</td>
<td>Improve walking and cycling conditions to expand the range of</td>
<td>5-15%</td>
<td>✓</td>
</tr>
<tr>
<td>Improvements</td>
<td>destinations serviced by a parking facility.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase Capacity of Existing</td>
<td>Increase parking supply by using otherwise wasted space, smaller stalls,</td>
<td>5-15%</td>
<td>✓</td>
</tr>
<tr>
<td>Facilities</td>
<td>car stackers and valet parking.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobility Management</td>
<td>Encourage more efficient travel patterns, including changes in mode,</td>
<td>10-30%</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>timing, destination and vehicle trip frequency.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parking Pricing</td>
<td>Charge motorists directly and efficiently for using parking facilities.</td>
<td>10-30%</td>
<td>✓</td>
</tr>
<tr>
<td>Improve Pricing Methods</td>
<td>Use better charging techniques to make pricing more convenient and</td>
<td>Varies</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>cost effective.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial Incentives</td>
<td>Provide financial incentives to shift mode such as parking cash out</td>
<td>10-30%</td>
<td>✓</td>
</tr>
<tr>
<td>Unbundle Parking</td>
<td>Rent or sell parking facilities separately from building space.</td>
<td>10-30%</td>
<td>✓</td>
</tr>
<tr>
<td>Parking Tax Reform</td>
<td>Change tax policies to support parking management objectives.</td>
<td>5-15%</td>
<td>✓</td>
</tr>
<tr>
<td>Bicycle Facilities</td>
<td>Provide bicycle storage and changing facilities.</td>
<td>5-15%</td>
<td>✓</td>
</tr>
<tr>
<td>Improve Information and</td>
<td>Provide convenient and accurate information on parking availability</td>
<td>5-15%</td>
<td>✓</td>
</tr>
<tr>
<td>Marketing</td>
<td>and price, using maps, signs, brochures and the Internet.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve Enforcement</td>
<td>Insure that regulation enforcement is efficient, considerate and fair.</td>
<td>Varies</td>
<td></td>
</tr>
<tr>
<td>Transport Management Assoc.</td>
<td>Establish member-controlled organizations that provide transport and</td>
<td>Varies</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>parking management services in a particular area.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overflow Parking Plans</td>
<td>Establish plans to manage occasional peak parking demands.</td>
<td>Varies</td>
<td></td>
</tr>
<tr>
<td>Address Spillover Problems</td>
<td>Use management, enforcement and pricing to address spillover problems.</td>
<td>Varies</td>
<td></td>
</tr>
<tr>
<td>Parking Facility Design and</td>
<td>Improve parking facility design and operations to help solve</td>
<td>Varies</td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td>problems and support parking management.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>