US Department
of Transportaion

A Guidance Manual for Implementing Effective Employer-based Travel Demand Management Programs

November 1993

"A Guidance Manual for Implementing Effective Employer-based Travel Demand Management Programs" is one in a series of planned reports on Travel Demand Management (TDM) provided by the Federal Highway Administration and the Federal Transit Administration. Other reports in the series include "Implementing Effective Travel Demand Management Measures: Inventory of Measures and Synthesis of Experience," a guidance manual for government-based TDM programs, a guidance manual for market research in TDM, and a microcomputer analysis tool (with documentation) for the evaluation of TDM projects. This report, as well as the others in the series, is intended to provide technical assistance to individuals in the public and private sectors who are responsible for planning, implementing, operating, and/or monitoring TDM activities. The entire series of reports serve to help educate on the state-of-the-practice and guide in the development of TDM programs.

Additional information on TDM may be obtained from:

The Office of Traffic Management IVHS (HTV-31)
Federal Highway Administration
400 Seventh Street, SW
Washington, D.C. 20590

202-366-4069

or

The Office of Mobility Enhancement (TTS-10)
Federal Transit Administration
400 Seventh Street, SW
Washington, D.C. 20590

202-366-0240

A GUIDANCE MANUAL FOR IMPLEMENTING EFFECTIVE EMPLOYER-BASED TRAVEL DEMAND MANAGEMENT PROGRAMS

Final Report
November 1993

Prepared by
Comsis Corporation
8737 Colesvile Road
Silver Spring, Maryland 209 10
and
The Institute of Transportation Engineers
525 School Street, Suite 410
Washington, D.C. 20024-2797

In association with
Georgia Insitute of Technology
K.T. Analytics, Inc.
R.H. Pratt, Consultant, Inc.

Prepared for
Federal Highway Administration &
Federal Transit Administration
U.S. Department of Transportation
400 Seventh Street SW
Washington, D.C. 20590

Distributed in Cooperation with
Technology Sharing Program
U.S. Department of Transportation
Washington, D.C. 20590

DOT-T-94-05

TABLE OF CONTENTS

Chapter **Page**

TABLE OF CONTENTS
(continued)

Chapter **Page**

LIST OF FIGURES

LIST OF WORKSHEETS

EMPLOYER-BASED TDM PROGRAM GUIDANCE MANUAL

PURPOSE AND USE OF THE MANUAL

How This Manual Can Help You

In recent years, worksite travel demand management (TDM) has become increasingly accepted as a tool to reduce peak period traffic congestion and air pollution, and help solve transportation-related problems at individual worksites. Recognizing its potential benefits, a growing number of businesses are embracing TDM programs. Further, in response to federal and state legislation, many states and local areas are encouraging or requiring employers to implement TDM programs at their worksites.

If you are reading this, it is likely that you are considering developing a TDM program. If you are like most employers, however, you probably have had little exposure to commute management. Numerous documents are available to guide employers in implementing and marketing TDM programs, but little guidance has been offered on TDM program planning and TDM strategy selection. As a result, many TDM programs are ineffective or were developed by an inefficient process of trial and error. This manual is designed to help employers, developers, property owners and managers, transportation management associations (TMAs), TDM consultants. It is also meant to benefit others planning, implementing, or evaluating employer-based TDM programs to create, with a minimum of experimentation, programs that are effective in reducing commute trips.

This manual suggests a process for TDM development and implementation, and offers guidance on the selection of effective TDM strategies. It will help you develop a more effective TDM program in less time and with less frustration. It provides an overview of the "big picture" of TDM planning, then guides you in identifying what strategies make sense for you, and in determining how much of those strategies you need to achieve a desired or required trip reduction. By choosing just the right level of effort - not too little, not too much -you will reap the benefits of a successful TDM program with a minimum of time and money expended.

Organization of the Manual

The manual is divided into five chapters and three appendices:

Appendix A TDM Impact Estimation Look-up Tables
Appendix B Blank TDM Impact Assessment Worksheets
Appendix C References and Resources

Chapter 1 presents an overview of travel demand management (TDM) and explains TDM's role in congestion and air quality management. Chapter 2 discusses the typical reasons TDM programs are implemented and the benefits they can offer employers. Chapter 3 defines common TDM strategies and highlights the applications of each one at a worksite. Chapter 4 presents a process to develop an employer-based TDM program, and outlines six basic steps that should be undertaken as part of the process .

Chapter 5, the heart of the manual, offers guidance on selecting TDM strategies to produce a needed level of trip reduction. This chapter, and Appendices A and B that accompany it, presents a series of worksheets and look-up tables with which you can estimate trip reduction impacts of individual TDM strategies and packages of strategies. These tables can be used to test the trip reduction impacts of various packages of TDM strategies you might be considering. Alternatively, working in the reverse direction, you can use the tables to identify packages of strategies that will produce a desired level of trip reduction.

The primary purpose of this document is to guide employers in selecting TDM strategies. As Chapter 4 of the guide explains, this is only one of many steps in developing and implementing a TDM program. Advanced guidance also is available on TDM marketing research, program promotion and marketing, program evaluation, and other TDM topics. The appendix lists information sources for readers who want to go beyond the basics.

1. INTRODUCTION

WHAT IS TRAVEL DEMAND MANAGEMENT?

Travel demand management (TDM) is not one action, but rather a set of actions or strategies, the goal of which is to encourage travelers to use alternatives to driving alone, especially at the most congested times of the day.

The term TDM encompasses both alternative modes to driving alone and the techniques, or strategies, that encourage use of these modes. TDM alternatives include familiar travel options such as:

- ***Carpools and vanpools***
- ***Public and private transit (including buspools and shuttles)***
- ***Bicycling, walking, and other non-motorized travel***

TDM alternatives also can include "alternative work hours," program options that reduce the number of days commuters need to travel to the worksite, or that shift commuting travel to non-peak period times of the day. Alternative work hours include:

- ***Compressed work*** weeks, in which employees work a full 40-hour work week in fewer than the typical 5 days;
- ***Flexible work schedules,*** which allow employees to shift their work start and end times (and thus travel times) to less congested times of the day; and
- ***Telecommuting,*** in which employees work one or more days at home or at a "satellite work center" closer to their homes.

TDM strategies include improvements in alternative modes of transportation; financial and/or time incentives for commuters who use alternative modes; information dissemination and marketing activities that heighten travelers' awareness of and/or interest in alternatives; and supporting services that make the use of alternatives more convenient or that remove psychological impediments to use of alternatives. Examples of TDM strategies are:

- ***Improvements to existing transportation services,*** such as shuttle buses and Vanpool programs;

- ***Financial/time incentives,*** for example, preferential parking for ridesharers, subsidies for transit riders, and transportation allowances;

- ***Parking management programs;***

- ***Priority treatment for ridesharers,*** for example, high occupancy vehicle (HOV) lanes and freeway ramps; and

- ***Employer support measures,*** such as employee transportation coordinators, on-site transit pass sales, on guaranteed ride home programs; and

- ***Marketing andpromotion,*** such as transportation fares and periodic prize drawings for ridesharers.

Most TDM programs include some combination of these strategies, chosen to encourage commuters to use the commute alternatives that are appropriate for the area and population in which they are to be implemented. A TDM program can be targeted to an entire area, such as a city or county; to a highway corridor, often one that is significantly congested or undergoing reconstruction; to a small local area, such as an employment park; or to a single site. Although many of the principles of TDM program development are universal, not all strategies are common to all situations. This manual focuses on the last situation, TDM programs developed for a single site, specifically an employment site - an employer-based TDM program.

IS TDM FOR REAL?

The primary goal of most TDM programs is to reduce commute trips in a particular area and/or at a particular time of day. Research conducted throughout the country has shown that a TDM program can be very effective, reducing vehicle trips by as much as 30 or 40 percent if properly conceived and implemented. Program effectiveness varies widely, however, by program type, by site, and by the TDM strategies chosen.

EMPLOYER-BASED VERSUS AREA-WIDE PROGRAMS

Of the four TDM program situations described above (regional, corridor, activity center, and employment site) employer-based TDM programs often are the most effective in reducing trips. TDM strategies can be chosen to meet a relatively narrow set of worksite characteristics, operational characteristics, and commuters' demographic and travel characteristics. Information dissemination can be targeted precisely to the employees most likely to use the alternatives, and offered in a personalized manner that eases commuters' transition to an unfamiliar travel mode. Further, employers can establish a "corporate culture" that affirms employees'

decision to use a commuting alternative. These factors combine to create a favorable atmosphere for trip reduction.

Area-wide programs are less likely to result in large reductions in commute trips because they must accommodate greater diversity in the factors that influence commuters' choice of travel mode. For example, availability of travel options such as public transit, the distance commuters travel to work, the flexibility they have in when they travel, and worksite characteristics and conditions all influence commuters' travel mode choices. Further, research has shown that commuters are more responsive to TDM strategies when they are presented at the worksite, even if sponsored by a regional group. Thus, the success of an area-wide program depends heavily on the extent to which individual employers support the program. Since generally, not all employers will fully participate, administrators of the area-wide program cannot expect to reach the trip reduction percentage of an employer acting alone at a worksite.

IMPACT OF SITE CHARACTERISTICS

Research by several groups has shown that the physical characteristics of the site, and characteristics of the employer and employees, also affect the success of a TDM program. Although successful employer-based TDM programs occur in a wide variety of settings, the most effective programs often share several characteristics:

- the employer is located in an area of high employment density, as in a downtown area;
- employee parking is restricted or constricted;
- public transit service is frequent and wide spread;
- employees have access to high-occupancy-vehicle (HOV) facilities;
- the work force includes few employees in professional or management positions or many employees in service and skilled labor positions; and
- a significant number of employees commute relatively long distances (greater than 15 miles)

Programs in areas that exhibit these site and employment conditions have a natural advantage in reducing vehicle trips because the conditions offer employees more alternatives to driving alone, make it easier to use those alternatives, or make it less attractive to drive alone. For example, as the number of transit lines increases, more employees will find a bus line and schedule that fits their travel needs. Conversely, a shortage of employee parking makes it harder to find a space each morning and encourages employees to consider travel alternatives such as vanpooling, in which

they do not need to drive and park. Sites that have these "TDM favorable" conditions can be expected to produce greater trip reduction for a given set of TDM strategies than another site with less favorable conditions.

EFFECTIVENESS OF DIFFERENT TDM STRATEGIES

Finally, the level of trip reduction that can be achieved at a given site depends on the types and levels of TDM strategies implemented. In general, the most effective strategies are those that offer commuters a ***time or financial*** incentive to shift from driving alone to an alternative mode. As the sayings go, "time is money" and "money talks." Commuters respond, not surprisingly, to strategies that offer a tangible value. Thus, direct transit subsidies, which put dollars in a transit rider's pocket, and preferential parking, which offers carpoolers prime parking spaces near the building entrance, are strategies that have been shown to influence commuters' choice of commute mode. Further, the higher the value of the incentive, the better the employee response.

Strategies must, however, be appropriate to the site at which they are implemented. Transit subsidies would have little value at a location that has little or no transit service. Similarly, a company-sponsored Vanpool program would attract few employees in a company where most employees commuted very short distances. A bicycling or walking subsidy could be effective at this company, however, as these modes and this subsidy would target short-distance commuters. The key to maximizing the effectiveness of your TDM program is to determine what alternatives your employees would be able to use, and build your program around incentives that most strongly encourage use of those modes. The ***Market Research and Evaluation Guidance Manual,*** a companion to this document, will provide assistance in determining the characteristics and particular needs of your employee population and environment.

EMPLOYER-BASED TDM PROGRAM EXAMPLES

There are numerous examples of highly effective employer-based TDM programs across the country. Consider the following:

San Diego Trust & Savings Bank, located in downtown San Diego, offers its 500 employees a 125 percent transit subsidy. The company provides no employee parking, but employees who choose to drive are given a parking allowance, to be used to purchase parking in an off-site garage ($100 per month average market cost). Ridesharers receive a higher allowance (up to $100 per month) than those who drive alone per month). Thirty-seven percent of the bank's 500 employees use transit, substantially higher than the 19 percent average transit use for all employers in the Central Business District. The bank also has a significant Carpool share of 14 percent. This use of commute

alternatives represents a 23 percent trip reduction compared to all downtown employers, and a 28 percent reduction compared to other downtown banks.

Nuclear Regulatory Commission, located in North Bethesda, MD (suburban Washington, D.C.), has limited on-site parking (365 spaces on site for 1,400 employees) and charges employees $60 per month for parking. Although the area is primarily auto-oriented, the site is 1/2 block from a regional subway station and has reasonable public bus service. The agency provides guaranteed parking for carpools, offers on-site sales of subsidized transit passes (subsidy provided by Montgomery County, since as a federal government agency, NRC is not allowed to subsidize employee travel), and heavily promotes commute alternatives). This combination of measures has resulted in a mode split of 42 percent drive-alone, 27 percent Carpool, and 28 percent transit. This is compared to a mode split for the surrounding area of 90 percent drive-alone, 6 percent Carpool, and 4 percent transit.

US West, a telecommunications company, is located in Bellevue, WA, a suburb east of Seattle. When it consolidated its regional operations at a new Bellevue location, US West faced a restriction on parking (by city regulation) and a requirement to implement a TDM program. US West implemented the following program: limited on-site parking (408 spaces for 1,150 employees), parking charge of $60 per month for drive-alone, $45 for two-person Carpools, and no charge for pools of three or more, reserved parking for HOV, flexible work hours, and an on-site transportation coordinator. As a result, only 26 percent of US West's employees drive alone, and the company generates 47 percent fewer trips than other downtown Bellevue employers.

GEICO, in Friendship Heights, MD, developed a TDM program when it consolidated 2,500 employees into a new headquarters in this medium density "suburban downtown." Parking is somewhat restricted, but the site is within a few blocks of a regional subway station. GEICO's TDM plan included: restricted on-site parking (1 ,020 spaces for 2,500 employees) and parking fees of $30 to $60/month in a garage and $10/month in a surface lot. Other TDM measures included free parking and reserved spaces for Carpools and Vanpools, a subsidized vanpool program, and transit subsidies. Only 40 percent of GEICO's employees drive-alone, 20 percent rideshare, and 31 percent use transit. Compared to a nearby area with similar parking conditions and levels of transit service, GEICO produces 39 percent fewer vehicle trips.

Transamerica Life Companies, an insurance company with more than 3,000 employees, is located 10 blocks south of downtown Los Angeles. Transamerica Life's TDM program, which developed over a period of 13 years, includes: a vanpool program (leased vans; maintenance, insurance, and administration provided), parking charge of $35 to $62/month (market rate of

$100); free parking for vanpools and parking discount for carpools, and transit subsidy of $15/month. The company supports these financial elements with a guaranteed ride home program, emergency use of company cars, work hours flexibility, and bike racks and shower/locker facilities. As a result of these measures, fewer than 50 percent of Transamerica employees drive alone (21 percent Carpool, 14 percent transit, 19 percent vanpool) and the company generates 20 percent fewer trips than other downtown Los Angeles employers.

Bellevue City Hall, in Bellevue, WA (suburban Seattle) employs approximately 600 people in a small business complex outside the Bellevue downtown. Transit service at the site is limited, making access dependent on private vehicles. To encourage use of alternative modes, the city implemented the following TDM strategies: employees who drive alone pay a parking charge of **$30** per month, those who carpool/vanpool at least 60 percent of the time park free and are given priority parking. Employees who use commute alternatives at least 80 percent of the time are given an additional subsidy of $15 to $25 per month. As a result of the program, nearly 50 percent of City Hall employees use transit, Carpools, vanpools, or other alternatives, representing 26 percent fewer vehicle trips than other sites in the region. Further, as parking fees are used to subsidize alternative modes, the net cost of the program to the city is zero.

Varian Company, The Varian Company employs about 4,500 people, 3,200 of whom work in a suburban office complex in Palo Alto, CA. Parking at the site is free, but not abundant, and bus transit is reasonably available in the area. Varian's TDM program includes: a 25 percent transit pass discount and on-site transit pass sales, and promotion of carpooling, cycling, and transit. With this program, Varian reduced its vehicle trips by 18 percent. Only 62 percent of its employees drive alone, 21 percent Carpool, 3 percent Vanpool, and 8 percent use transit.

Ventura County Government Center, Ventura County, CA (west of Los Angeles) employs about 2,700 people at its suburban headquarters site. Neither the county or the site is well-served by transit, and the site has abundant, free on-site parking. The county initiated a TDM program in 1990, in response to a county air quality regulation. To offer employees daily flexibility in choice of mode, the county implemented a cash incentive that rewards employees based on the number of days they don't drive alone during the year, regardless of the alternative used. Employees receive one "point',' for every day of the year they do not drive alone to work. Employees who accumulate 144 points (average of three times per week) receive a $300 cash payment; employees who accumulate 96 points (average of two times a week) receive a $200 cash payment. To support the program, the county offers a guaranteed ride home program, preferential parking, and bike/walk facilities. In the first 5 months, the County's vehicle trips decreased by 13 percent, with only 69 percent of employees driving alone.

2. WHY IMPLEMENT A TDM PROGRAM?

FOUR REASONS TO IMPLEMENT TDM

A TDM program can support numerous employer and area-wide goals. The primary goals of most area-wide TDM programs are to relieve congestion, improve air quality, and/or reduce energy consumption. While these also can be goals of employer-based programs, your reasons for implementing a TDM program likely are more specific, probably one or more of the following:

- Respond to a trip reduction regulation;
- Solve a transportation-related problem at your worksite;
- Expand your employee (or tenant) benefits package; and/or
- Reduce company expenses.

RESPOND TO REGULATION

Many of the employers (and developers) now implementing TDM programs are doing so to comply with a state or local regulation requiring them to reduce trips to their worksites. Such requirements are currently in place in parts of California, Arizona, and Washington, and soon will be in effect in parts of Pennsylvania, New Jersey, Connecticut, Maryland, New York, Texas, Illinois, and other states.

The specific requirements and names for the programs -- Employer Trip Reduction, Employee Commute Options, Commute Trip Reduction, etc. -- vary by location, but the program concepts are the same. Employers, generally above a certain size, develop and implement TDM strategies to reduce the number (or percent) of employees who drive alone to the work location. Some regulations also apply to developers and building managers of commercial and residential real estate projects. In these cases, incentives are provided to encourage tenants' use of alternative modes.

If your company is subject to a state or local regulation, be sure you clearly understand the details of the requirements. Some regulations specify strategies you must include in your TDM plan, a target trip reduction (or other measure of success) you must achieve, and other conditions you must meet. This guidance manual does not discuss requirements of any individual regulation, but will assist you in developing an effective TDM program.

SOLVE A SITE-SPECIFIC TRANSPORTATION PROBLEM

Although compliance with regulation is the most frequently cited reason for developing a TDM program, it is by no means the only reason. Many employers nationwide have used TDM as a way to solve a transportation-related problem at their site.

For example, perhaps your workforce is rapidly growing and you have a shortage of parking spaces. You could lease additional parking spaces off- or perhaps on-site. Alternatively, you could offer Carpool and transit incentives to reduce the demand for parking. Or, maybe you are relocating to a site far from the dominant residential areas of your employees. You could initiate a vanpool or buspool service to ease employees' commute to the new site. As another example, perhaps employee tardiness has increased because your worksite is located in a highly congested area, with unpredictable travel times. You might institute work hours changes that allow employees to arrive earlier or later than the peak travel periods. Chapters 4 and 5 of this manual offer guidance in choosing strategies to solve individual problems such as these.

EXPAND EMPLOYEE BENEFKS PACKAGE

Some employers, such as San Diego Trust & Savings Bank mentioned above, are turning to TDM programs as an enhancement to the employee benefits package. Benefits packages, which in the past often included only holidays, vacations, and insurance coverage, increasingly are being expanded to include tuition assistance, child care and elder care programs, health club memberships, and other components. Commuter incentives generally can be easily added to the package. Transportation allowances, which are given to all employees to pay for whatever commuting mode the employee chooses, are especially appropriate for a benefits package, because they apply equally to all employees. Companies that subsidize employee parking might consider offering incentives to employees who use alternative modes as a way of equalizing the benefits offered to employees who drive alone and those who do not.

REDUCE EMPLOYER COSTS

Finally, some employers are implementing TDM strategies because it saves them money. Highly successful programs, such as those implemented at US West in Bellevue, WA, can reduce so many trips that the company might be able to reduce the number of parking spaces it leases or use parking lots it owns for other purposes. For example, a company that is expanding its facilities might be able to build an additional structure on a now unused parking lot. Alternatively, the company could lease excess parking to a neighboring company. The company also might find its TDM program reduces costs by reducing employee tardiness and raising employee productivity,

because employees arrive at work refreshed, rather than stressed from difficult commutes.

HOW MUCH TDM DO YOU NEED?

Regardless of the reason or reasons you are implementing your TDM program, this manual will help you determine which TDM strategies make sense for you. But it will serve an equally important function, especially if you are required by regulation to achieve a particular target, of showing you how aggressive your TDM program must be. In short, it will identify the level of effort appropriate to the seriousness of the problem you are facing.

If you need or want to reduce only a very few trips, you might need only to provide information to employees on transit routes and schedules, and offer ridematching assistance. If you must meet an ambitious trip reduction target, however, or have a serious parking shortage, your program likely will need to be more aggressive, perhaps offering employees significant, direct financial incentives, or imposing a financial disincentive such as a parking fee.

At some locations, your ability to reduce vehicle trips could be constrained by the lack of commuting alternatives available to your employees. For these situations, significant trip reduction might require that you provide additional commute alternatives, such as vanpools, shuttles to park and ride lots, or even express buses from residential areas to your site. Chapter 5 of this manual provides worksheets to help you determine your needed level of program effort, and identify TDM strategies that will allow you to reach your target.

3. TDM STRATEGY QVERVIEW

INTRODUCTION

As mentioned in Chapter 1, TDM encompasses both alternatives to driving alone and the techniques, or strategies, that encourage their use. TDM alternatives include carpooling and vanpooling, public and private transit, bicycling and walking, and other non-vehicle travel options. TDM alternatives also can include "alternative work hours," program options that reduce the number of days commuters need to travel to the worksite, or that shift commuting travel to non-peak times of the day.

TDM strategies include improvements in alternative modes of transportation; financial and/or time incentives for commuters who use commute alternatives; parking management programs, priority treatment for ridesharers, information dissemination and marketing activities that heighten travelers' awareness and/or interest in alternatives; and supporting services that make the use of alternatives more convenient or that remove psychological impediments to use of alternatives.

As an employer, not all alternatives or incentives will be available to you. Some options, such as development of priority lanes for Carpools and other high occupancy vehicles (HOVs), fall only within the power of local governments. Although you cannot implement these strategies, you may be able to influence their provision by local governments. This manual focuses on those alternatives and strategies employers can incorporate in a worksite TDM program. The following sections describe elements typically implemented by employers.

COMMUTE ALTERNATIVES

ALTERNATIVE MODES

Carpooling and Vanpooling - Carpooling is the backbone of most employer-based TDM programs. In a carpooling arrangement, two or more employees ride together to work in a personal or company-owned auto. Vanpooling, in which seven to 15 employees commute in a van equipped as a commuting vehicle, is somewhat less common, but can contribute significantly to a trip-reduction program. Regardless of the number of occupants, the common element in ridesharing is that each ride shared represents another vehicle trip removed from the highway.

Carpooling is an especially important alternative because its door-to-door directness and convenience provide a level of service most nearly like that of the single-occupant vehicle. Its principal disadvantage, magnified for Vanpools, is that it requires riders to commit to a common schedule. This can cause

difficulties for commuters whose work hours are not consistent from one day to the next. Often these problems can be mitigated through schedule planning, part-time ridesharing, and the provision of back-up services, such as a guaranteed ride home when overtime is required.

Carpooling and vanpooling can be implemented at nearly all worksites, although certain site and employee characteristics favor ridesharing success:

- Consistent work hours
- Residential concentrations of employees
- High percentage of employees with commutes longer than 10 miles or 20 minutes (20 miles or 40 minutes for vanpooling)
- High percentage of employees with low to moderate salaries
- Availability of nearby HOV lanes
- Constrained parking supply

Public or Private Transit - Transit is an important component of a TDM program in certain settings as well. Clearly, transit service must be available, but site and employee characteristics such as low to moderate employee salaries, longer commutes, and constrained parking also contribute to the use of transit service. Transit use is further encouraged when:

- HOV lanes are available and open to transit vehicles
- Employee work hours are consistent with transit schedules
- High percentage of employees do not have access to an automobile
- Frequent transit service is available within 1/2 mile of employees' home and within a few blocks of the worksite

Commuter Bicycling and Walking Programs - Bicycling and walking often are overlooked as viable commute alternatives in the United States. While it is true they apply only to a limited group of commuters, it also is true that relatively little has been done in the United States to encourage use of bicycling and walking for commuting. Bicycling and walking are limited somewhat by geography, climate, commute distance, and employee lifestyle. Clearly, these modes are geared to short-distance commutes, although Americans' growing interest in health could signal wider application of non-motor vehicle

commuting. Site and employee characteristics that most favor these modes include:

- Short-distance commutes (five miles or less for bicycling and two miles or less for walking)
- Relatively flat terrain in the area of the worksite
- Mild temperatures and dry climate
- Safe commuting paths (low traffic volume roads, bikepaths, sidewalks)

Twenty percent of the 500 employees at Xerox' Palo Alto, CA office bicycle to work. Bicycle facilities on-site and a corporate commitment to bicycling have made this possible. Secure bike lockers are provided in a covered area in front of the company security office, and bicyclers have free use of personal lockers and showers. Xerox also includes bike displays from bicycle manufacturers and local shops at its periodic bike fairs. Employees also have flex-time. The city of Palo Alto further encourages bicycling by providing a 40-mile network of bike lanes and paths throughout the area and distributing maps of city and county bike routes. The city estimates that 14 percent of area commuters ride a bicycle to work.

ALTERNATIVE WORK HOURS

Alternative work hours (or work hours management) options are a second broad category of commute alternatives. Because some work hours options affect only the timing of commute trips, rather than the number of trips made, they are not appropriate for all TDM programs, but can be an important TDM component when the goal is congestion relief, especially in a relatively small geographic area.

Employees and employers often find alternative work hours attractive not only because they open up new transportation options, but because they allow a better fit between work and family responsibilities. Under alternative work hours, employees might find it easier to manage household chores and personal business while working full-time. Absenteeism, tardiness, and turnover may be reduced in settings where workers need and want more flexibility.

Alternative work hours fall into four general categories:

- Staggered work hours
- Compressed work weeks

- Flexible work hours (Flextime)
- Telecommuting

Staggered Work Hours - In a staggered work hours program, employees' start work times are scheduled at intervals set by the employer, so that different groups of employees (often departments) begin work at different times. For example, employee start times might be set at 15 minute increments, with the Accounting department reporting at 8:00 am, the Production department starting at 8:15 am, and Shipping reporting at 8:30 am. The primary influence of this strategy is to spread peak traffic. Because it does not result in actual trip reduction, it has no application for air pollution-based trip reduction programs.

This alternative work hour option is most appropriate for offices and piece manufacturing facilities, where employees' responsibilities are not interdependent. A staggered work hours program can make it more difficult to form Carpools and vanpools, however, because employee work hours are no longer compatible throughout the company.

Compressed Work Weeks - Compressed work week programs allow employees to work a full work week in fewer than the usual five days. To make up the hours not worked on the "off" day, employees work more hours per day. Three compressed schedules are most common:

- "4/10" schedule, in which employees work four IO-hour days.
- "3/36" schedule, in which employees work three 12-hour days.
- "9/80" schedule, in which employees work eight 9-hour days (72 hours) plus one 8-hour day for a total of 80 hours over two weeks.

These options have two impacts on commute travel: they reduce number of days (and thus the number of miles) of commuting, and shift employees' travel to a time outside normal daily peak periods. Because of these two factors, compressed work hours programs can be effective for programs designed to reduce traffic congestion and reduce air pollution.

Compressed work weeks may be appropriate for office and administrative functions, and for line and piece manufacturing processes. If all employees have the same day off and the office/plant is closed on the off day, this schedule also can result in a cost saving for operating costs, but companies need to assess the impact of compressed work week options on company

operations. Service companies or those whose business is conducted primarily by telephone might need to maintain a minimum level of employee coverage.

Flexible Work Hours (Flex-time) - In flextime, employees are permitted to set their own arrival and departure times. Some flextime programs allow employees to arrive and leave at any time, as long as they accumulate the required number of hours (typically 40) over the course of a week, but most programs establish "core hours," a band of time during which all employees must be in the office or plant. For example, employees must arrive no later than 10 am and leave no earlier than 3 pm. For an 8-hour day, employees would be allowed to begin as early as 7 am (7am to 3 pm) or end as late as 6 pm (IO am to 6 pm).

Flextime can influence travel behavior in several ways. In congested areas, it may encourage employees to avoid most congested times, thereby shifting traffic to less busy times. Flextime also can encourage transit use, by allowing employees to shift their arrival times to accommodate transit schedules. Flextime's impact on ridesharing is less clear. Where work hour differences within a company are a barrier to ridesharing, it can encourage rideshare candidates to coordinate arrivals and departures where they previously could not. But flextime itself may be a barrier to ridesharing, because fewer employees will have similar schedules.

Flextime is most applicable to offices and among administrative and information workers who work independently. It is less appropriate for shift workers and assembly lines, or where there is need for continuous communication between workers schedules.

Telecommuting - Telecommuting is more accurately an alternative "location" strategy than alternative work hours strategy, because it allows employees to work at home or at an alternative work location closer to their homes (satellite work center or neighborhood work center). Employees may be linked to the work-place by computer and modem, or simply may do work that requires nothing more high-tech than a telephone. Employees can telecommute full-time or just a few days per week.

Telecommuting's impact on travel is not well-documented. Telecommuting can reduce the number of work trips for those working at home, and/or their length for those working at satellite or neighborhood centers. Telecommuters may make fewer trips or shorter trips, depending on whether they telecommute from home or from a satellite work center. Telecommuting also may influence mode choice. Telecommuters may switch from solo driving to walking, cycling, or transit to access neighborhood or satellite centers close to home. Or, they could switch from alternative modes to solo driving for the days they do not telecommute, if part-time Carpool or vanpool use is not an option.

Although managers often are wary of telecommuting, fearing employees' productivity will suffer, this alternative may actually improve morale and productivity. In a pilot project AT&T and state agencies in Phoenix, AZ, 80 percent of supervisors of telecommuters said telecommuting increased employee productivity, and 76 percent said telecommuting improved employee morale. Ninety-eight percent thought the pilot program should be expanded.

TDM STRATEGIES

Employers have many options for encouraging employees' use of commute alternatives. These TDM strategies fall into four primary categories:

- Improvements to alternative modes such as transit and vanpooling.
- Financial incentives given to employees who use commute alternatives.
- Parking management programs.
- Commute alternatives information and marketing

IMPROVEMENTS TO ALTERNATIVE MODES

Incentives for the use of commute alternatives will be effective only if the commute alternatives they promote are available. Employers may be able to implement improvements to at least two commute alternatives: transit service and vanpools.

Transit Service Improvements-Central to employees' choice of transit for commuting is the availability and attractiveness of transit at both their home and worksite locations. Transit service is most commonly provided by public transit agencies, and for reasons of economics, is generally provided on a relatively rigid structure of routes and stops. As population and employment become more decentralized, public transit is less able to accommodate travel patterns cost effectively, resulting in less direct, less frequent, and generally less attractive service.

As an employer, you can work with public transit agencies to change transit routes and schedules of transit service at your worksite. Alternatively, you can contract with a public or private bus company to provide new transit services targeted specifically to the needs of your employees, absorbing or sharing in the cost of providing the additional service. Swedish Hospital Medical Center, a large hospital in Seattle, WA, contracted with the local public transit operator to operate the "First Hill Express," an express bus service from several suburban residential areas. Several other nearby hospitals also participate in this service, which is funded primarily by transit passes purchased by the

hospitals and given or sold to employees. Transit service improvements might include:

- Express buses (buspools) from concentrated residential locations or park and ride lots to your worksite

- Shuttle buses from nearby residential areas to the worksite

  Shuttle buses between multiple company sites or between your worksite and nearby retail areas (generally mid-day trips)

These service types are not necessarily appropriate as conventional transit services. They might use small vehicles, be restricted to use by your employees, or employees from your company and a few neighboring employers, or be implemented on a "subscription" basis, with employees reserving pre-paid seats, much like on an airplane. In practice, these service types generally are provided most cost-effectively by a private transit operator, under contract to the employer.

A word of caution is needed regarding these services, however. They can be very expensive to operate; typically low cost-effectiveness is the reason public transit operators do not provide these services themselves. This does not mean you shouldn't consider new transit service as an option for your program, but it is doubly important to identify the market potential for the service, and weigh the costs and trip reduction benefits of new transit service against those for other TDM strategies.

Comprehensive Company Vanpool Program - Vanpools represent an important commute option, but unlike Carpools, their formation and operation can require special assistance. Employers can help employees to participate in Vanpools by centrally managing and/orsubsidizing operation of Vanpools. Although most often implemented by a single employer at a single worksite, groups of employers can form multi-company programs or can participate in a vanpool program sponsored by a transportation management association or other organization.

Company Vanpool programs often include subsidies to employees, and thus provide a positive economic incentive to encourage vanpooling, but a primary benefit of a company Vanpool program is access for employees to an additional commuting alternative. This can be especially important when the worksite is distant from the residential location, or otherwise inaccessible. Long-distance commuters also often highly value vanpooling as a convenient and stress-free travel option.

Company vanpool programs differ by employer, but in general, will include several of the following elements:

- Employer owns or leases vans for travelers' use, or subsidizes start-up of employee-owned/leased vehicles.

- Employer insures, fuels, and maintains vehicles (or contracts for services).

- Employer assists in Vanpool ridematching and other formation/ operation tasks.

- Employer offers subsidies to Vanpools or riders (e.g., introductory, on-going, and "longevity" payments; free parking for Vanpools).

The employer also might maintain one or more back-up vehicles for emergency use, temporarily underwrite a portion of the Vanpool cost during a transition in ridership ("empty seat subsidy"), and support the Vanpool in other ways as part of the company's overall TDM program.

Jet Propulsion Laboratory, in Pasadena, CA, provides a $15 per month subsidy to Vanpools and $250 start-up seed funding. The company supports the program by fueling and washing the vehicles, providing preferential Vanpool parking, and a guaranteed ride home program. Since the program's inception in 1989, over 30 Vanpools have been formed and vanpooling's share has risen from 1 percent to 6 percent. JPL vanpoolers also benefit from various state and county Vanpool subsidy and tax credits. The net vanpooling expenditure per employee per month is about $20; average fares are $60-$80.

FINANCIAL INCENTIVES

Two key factors in a traveler's choice of travel mode are its cost (in both dollars and time) and convenience relative to that of other modes. Although most commute alternatives offer a natural cost advantage through the sharing or elimination of expenses, many commuters weigh this saving against the often longer travel time and reduced convenience of using a commute alternative, and choose to drive alone, Financial incentives offered to employees who use alternatives to driving alone compensate for these modes' disadvantages and provide a strong economic incentive to shift from single operated vehicles (SOVs).

Financial incentives can take many forms. They can be offered on a regular, on-going basis, such as a monthly subsidy; or as an introductory incentive to encourage first-time use of a commute alternative. They can be direct cash payments; reductions in fees, such as those for parking, employees otherwise would have to pay; or incentives with indirect economic value, such as paid time off from work or a chance in a prize drawing. Three common financial incentives included in employer programs are

- Rideshare subsidies
- Transportation allowances
- Indirect financial incentives

Rideshare Subsidies - Rideshare subsidies are regular, periodic payments made to employees who use Carpools, Vanpools, transit, bicycling, or other alternatives to driving alone. They can be offered for all alternative modes or only certain targeted modes. Subsidies are most often provided as cash payments, of a ore-set amount or as a reimbursement for actual travel costs, but also can take the form of pre-paid fare media such as transit passes, or as "coupons" or scrip redeemable for cash. Subsidies provide a positiwe economic incentive to shift from driving alone to alternative mode(s). In addition, the regularity of the payment continuously reinforces the motivation.

Union Bank, located in downtown San Diego, offers its 315 employees a 100 percent transit subsidy. Employees have free parking, but off-site, in a company-leased garage located several blocks away. Monthly garage pass holders are given passes to the downtown trolley service, which connects the garage to the office. Union Bank has a transit share of 36 percent, substantially higher than the 19 percent average for all employers in the CBD. This transit share equates to a 15 percent trip reduction compared to all downtown employers.

Transportation (or Travel) Allowances- Like subsidies, transportation allowances are regular, periodic payments, provided either as a cash payment or a one-time income adjustment. They differ from subsidies in that they are given to all travelers, including those who drive alone, to be used to defray the costs of travel. Allowances provide a positive economic incentive to shift from SOVs to less costly modes or modes in which costs are shared, because employees whose travel cost is less than the allowance pocket the difference. There also is an additional benefit of flexibility in mode choice, because no mode is favored

Allowances sometimes are implemented in conjunction with a parking charge, and are set to be equal to a parking charge. Employees can buy parking or apply the allowance to other travel costs. A travel allowance can act like a rideshare subsidy if it is coupled with a differential parking charge structure with a high rate for SOVs and lower rates for alternative modes.

Indirect Financial Incentives - Employers who do not want to offer employees a cash payment can provide a positive economic incentive to shift to ridesharing by offering indirect financial incentives - benefits with a measurable, monetary, but non-cash, value. Common indirect incentives include:

- Use of fleet vehicles for ridesharing (employer pays vehicle insurance).
- Subsidized fuel or maintenance provided through on-site facilities or vouchers accepted by local gas stations or repair shops.
- Extra vacation time accumulated by ridesharers.
- "Catalog" points awarded for ridesharing and redeemable for merchandise.
- Free or discounted equipment (e.g., walking shoes, bicycles, bicycle helmets, repair equipment, emergency roadside kits).

Allergan in Irvine, CA, offers employees one to two extra paid vacation days per year for ridesharing on a regular basis (two to three days per week or more). While Allergan provides transit and Vanpool incentives as well, the firm's drive alone rate is lower than the county-wide average (76 percent versus 86 percent) for an overall trip reduction of almost 8 percent.

PARKING MANAGEMENT PROGRAM

Perhaps the single most influential TDM strategy is worksite parking management. In most of the United States, abundant parking is provided to employees at no charge. Under these conditions, it is no wonder most employees drive alone. The goal of worksite parking management is to remove this overwhelming bias toward solo driving. Parking management includes three elements:

- Preferential parking for ridesharers,
- Parking pricing (fees), and
- Parking supply reductions.

Preferential Parking - Preferential parking for ridesharers is a low-cost, easy-to-implement incentive to encourage use of Carpools and Vanpools. In preferential parking, employees who rideshare receive reserved parking spaces near the entrance to the building. The spaces set aside for preferential parking will depend on the arrangement of parking at the site. Ridesharing spaces can be reserved in a covered structure, while solo drivers park in open lots. When on-site parking is limited, ridesharers can be given priority on-site, while solo drivers park off-site. In situations where parking facilities (and thus walking distances) are large, where parking facilities vary in convenience or attractiveness, or where parking is limited, preferential parking can be an effective incentive.

Parking Pricing (Fees) - The second parking management element is a fee charged by the employer (or building management) for vehicle parking in a garage, lot, or other parking facility at a worksite. Not surprisingly, parking fees encourage use of alternative modes, because they provide an economic disincentive to driving (especially alone). An interesting aspect of this strategy is that is can generate revenue that can be used to subsidize employees who use transit and other alternative modes.

Parking fees can take many forms. Three of the most common are:

- Single fee paid daily by all vehicles entering the parking facility
- Single fee paid for a monthly parking pass (fee paid whether or not vehicle is parked every day of the month)
- Fee structure in which different fees are charged for different modes or at different times of the day; generally, discounts are offered to Carpools and Vanpools and/or to vehicles entering outside the peak period

The most effective parking pricing strategies are those that offer progressive discounts to vehicles as the number of occupants increases. Two-person Carpools receive a discount over solo drivers, but three-person and four-person Carpools and Vanpools receive even greater discounts. This strategy enhances the attractiveness of commute alternatives.

Parking Supply Reduction - The surest way to ensure trip reduction with parking management, or any other TDM strategy, is to limit the amount of parking available to employees. If not all employees have a space to park their single occupant vehicle, some employees will look for other commuting options. Although not all employers will have this as an option, those who can reduce the amount of parking they own or lease can not only reduce trips, but perhaps also save money from reduced lease or facility maintenance costs, or from the economic value of alternative uses of the parking.

INFORMATION AND MARKETING

Although the TDM strategies discussed above are the keystones to an effective program, TDM information and support are important complementary strategies. Commuters must be made aware of the availability of commute alternatives and be encouraged to try them. At a minimum, program marketing will include dissemination of information on available commute services, and incentives in assistance with finding ridesharing partners. Marketing often also includes, however, personalized commute planning assistance, special promotional activities such as prize drawings, and commute fairs or “clubs” that can increase employees’ interest in ridesharing, and other services that make use of a commute alternative more convenient.

Employer Ridematching Program - Some employees find Carpool and Vanpool partners with no assistance from their employer, but many employees need some assistance and encouragement. Employer-sponsored ridematching assists employees by identifying employees who want to use commute alternatives, and matching them in acceptable Carpool, Vanpool, and transit arrangements. Employers can further encourage ridesharing by introducing potential rideshare partners, easing the reluctance many employees have to contacting a stranger.

Information Dissemination - To disseminate information at a worksite, employers can utilize bulletin boards, flyers distributed desk-to-desk, in-house newsletters, new employee orientation, and periodic promotional events such as rideshare fairs. At its most sophisticated level, information assistance is provided by an on-site commute information center, staffed with a Transportation Coordinator trained to provide commute information and personalized commute planning. The center also can serve as an outlet for distribution of transit fare media or other commute products.

Transportation Coordinators - Most employer TDM programs utilize the services of a transportation professional who provides personalized assistance to commuters These professionals, often called Transportation Coordinators (or Employee Transportation Coordinators - ETCs) offer individual trip planning assistance, as well as performing more general marketing and information functions. The ETC is generally the focus of the company's commute program, and manages the program's development, implementation, marketing, administration, and evaluation. Most trip reduction ordinances and regulations require employers to select and train a ETC.

Special Promotions - TDM marketing also can include special promotions, such as periodic prize drawings, contests, awards for ridesharing, commuter or bicycle clubs, and other activities to attract the attention of commuters, generate excitement about the use of commute alternatives, and reward ridesharers. These promotions often are sponsored in conjunction with area-wide commuter promotions such as an annual ridesharing week or Earth Day. Special promotions are widely used, in part for their low cost and high "splash" value.

Guaranteed Ride Home Programs - A Guaranteed Ride Home (GRH) (or guaranteed return trip) program is "commuter insurance." It is a service that reduces employees' concern of being stranded without transportation in an emergency. In recent years, many commuter surveys have shown that an important factor in commuters' reluctance to rideshare is the fear they will not be able to respond to a personal emergency, such as in picking up a sick child at school, or be stranded without transportation if they work late unexpectedly. GRH programs offer free or subsidized emergency transportation, generally by taxi cab or rental car, to commuters who do not drive to work alone.

4. PROCESS FOR DEVELOPING and IMPLEMENTING A TDM PROGRAM

PROGRAM DEVELOPMENT

The primary purpose of this manual is to guide you in selecting appropriate strategies for your TDM program. As shown in Chapter 3, however, the list of possible TDM strategies can be quite long. To help identify the appropriate strategies for your situation, you first must complete several "prerequisite" tasks that will enable you to select strategies wisely, and take two follow-up steps that will make implementation more successful. Development of a TDM program includes five steps:

1. Determine program goals and define baseline
2. Conduct site analysis
3. Identify and select TDM strategies
4. Build management support
5. Prepare plan

DETERMINE PROGRAM GOALS AND DEFINE BASELINE

The first step in developing a TDM program is to define why you want to implement a TDM program and what you want or need to accomplish. Although TDM strategies have a common goal of reducing drive-alone travel during peak commuting times, they differ in their trip reduction impact, and in how easily and cost-effectively they can be implemented.

Your reasons for implementing a TDM program may influence your choice of strategies. If you are implementing the program as an employee benefit, you might choose to offer a transportation allowance, which gives employees flexibility in their mode choice, or offer a combination of strategies, with "something for everyone." If you need to resolve a serious parking shortage, you might want to target employee parking through a parking charge, or choose to promote transit and vanpooling, which have the greatest ability to remove trips. If you are developing a TDM program to comply with a trip reduction regulation, specific strategies or actions might be required by the regulation.

Next, you need to define your trip reduction target. There are two common ways employer-program TDM targets are established:

- A required Average Vehicle Ridership (AVR) (or other measure) target is set externally, by a trip reduction regulation, or

- A desired trip reduction is defined internally, to achieve some voluntary, "acceptable" level of site congestion or parking utilization.

List your reasons for considering TDM. Are you responding to a transportation or air quality regulation? If so, by what standard will you be measured and what target does the regulation set? If you are implementing the program for other reasons, how will you define success for the program? For example, if parking at the site is inadequate, what is an acceptable ratio of employees to parking spaces? The methodology in Chapter 5 suggest that the TDM program goal be defined as one or more of the following measures:

- A change in average vehicle occupancy;
- A reduction in daily vehicle trips; and
- A reduction in peak hour/period vehicle trips

Regardless of which measure you use, you will need to assess your current position, or "baseline," for the measure. The difference between this baseline and your goal defines the seriousness of your problem, which in turn determines how aggressive your program must be. To define your baseline, you probably will need to conduct an employee survey, perform traffic counts, or examine existing company records. A companion document to this manual, ***TDM Market Research and Evaluation,*** describes techniques to assist you in measuring your baseline.

CONDUCT SITE ANALYSIS

Successful TDM programs are site-specific; that is, strategies must be chosen to fit unique circumstances of the setting and target population. Therefore, after you have defined your baseline and your TDM goal, examine the characteristics of your employee population, your worksite, and your own company's operations to identify features or characteristics that might discourage or encourage the use of commute alternatives. Identify barriers to alternative mode use and determine how they can be changed or their impact minimized. Think also how to capitalize on site and employee characteristics favorable to commute alternatives.

First, examine characteristics of employees to determine which TDM strategies will fit your employees' travel needs and be acceptable to them. These characteristics include:

- Demographics: age, sex, job type, income, ethnic groups, etc.
- Travel patterns: From where, to where, how, and why employees now travel.

- Motivations: why employees use their current travel mode.
- Knowledge: employees' awareness of commute alternatives.
- Perceptions and attitudes: employees' feelings about commute alternatives.
- Interest: employees' interest in various alternatives and incentives.

Next, identify TDM barriers and opportunities presented by your worksite. This review should include an examination of:

- Availability and level of transportation facilities and services (e.g., HOV lanes, bikeways, and transit routes) in the area surrounding your site
- Geographic, land use, or design characteristics of the site (e.g., development density and availability of on-site or nearby services (e.g., restaurants)
- Traffic conditions in the nearby area (e.g., congested intersections).

Finally, explore characteristics of your company to determine if the TDM strategies you are considering are compatible with your company's operation and culture. This could include:

- Company "demographics" (e.g., size, business type).
- Company operations constraints (e.g., work hours, need for phone coverage).
- Management's awareness of and interest in transportation issues.
- Existing TDM program elements.

The Market Research and Evaluation Manual mentioned earlier offers additional guidance in identifying these characteristics. Examples of the application of various TDM strategies also are available in another companion document, ***Implementing Effective TDM Program*** (Main Report).

IDENTIFY AND SELECT TDM STRATEGIES

After you have analyzed your site and defined your baseline and goal, you can begin to identify and select the strategies for your TDM program. The strategies you choose must be compatible with site characteristics and with commute alternatives available

at the site, acceptable to employees, and compatible with the company's operations. Further, they must be able to produce the trip reduction impact needed or desired, in with the resources allocated for the TDM program.

Many other documents are available to assist you in exploring the range of TDM strategies which may be appropriate to your structure, including both the Market Research and Evaluation Manual and the Main Report, mentioned above. The primary purpose of this manual is to help you explore the actual effectiveness that these various measures can have in your situation, toward meeting your established goals. Chapter 5 of this guide presents a procedure and a series of worksheets you can use to sketch out typical TDM programs and evaluate their effectiveness.

BUILD MANAGEMENT SUPPORT

The success of your TDM program is heavily dependent on how supportive management is of the program. Management support obviously must come in the form of resources dedicated to the development and maintenance of the TDM program, but it refers more broadly to the overall "corporate commitment." Is upper management willing to provide significant, tangible incentives, and establish a corporate "culture" that supports (rather than penalizes) employees' use of commute alternatives?

A strong commitment typically is demonstrated by an extensive package of incentives offered to commuters, but supportive work environment policies, such as not holding meetings late in the afternoon, not penalizing ridesharing employees who choose not to work overtime, and rewarding employees for their contribution to the TDM effort, also are indications of corporate commitment. A corporate culture that supports ridesharing will reinforce the idea that ridesharing is a "good citizen" activity.

Building management support might require that you educate upper management on the benefits of developing and implementing the program (and perhaps penalties of **not** implementing it if the program is required by a regulation). It certainly will require that you clearly communicate employees' needs and desires, and regularly document and report the results of the program to key decision makers.

PREPARE PLAN

The final step in the TDM program development phase is to prepare a workplan for program implementation. It should, at a minimum, include the following elements:

- Program goals.
- Assessment of barriers and opportunities to commute alternatives.

- TDM strategies/incentives included in the program.
- How, when, and by whom TDM strategies and incentives will be implemented.
- Program budget and resource needs.
- Process for monitoring and evaluating program progress.

If you are required by a trip reduction regulation to submit a TDM plan, it is likely you will need to use a pre designed format that might or might not include all of these items. You should prepare all these elements, however, even if not all are required by the regulation, because the program plan will serve as your guide to implementation and a document to which you can refer frequently as the program is in place.

PROGRAM IMPLEMENTATION

Development of the TDM plan signals the beginning of the second TDM program phase - program implementation. The most complete TDM plan is useless unless it is put into practice. You must establish the internal structure, staff, and support services to enable smooth and efficient implementation of the TDM program, then promote the program to employees.

Any TDM strategy will offer its greatest impact if it is supported by a comprehensive TDM package. Obviously, commute alternatives and incentives to encourage their use must be available. But, strong promotion and corporate backing also must be present. Even financial incentives, shown to be quite important in reducing trips, can be effective only if employees are aware of the incentives and feel management supports their use. It is particularly important to reinforce employees' awareness of the program over time; otherwise, new employees and those whose travel patterns change might not participate. Chapter 3 described several important TDM information and promotion elements.

As with the selection of commute alternative incentives, how you market your TDM program will depend on the unique characteristics of your site: size, characteristics of your employees, the commute alternatives you are promoting, and other factors, This phase of the program is largely the domain of traditional marketing, and as such is not addressed here. Specific marketing strategies are well-documented in other guides, however, and several of them are noted in Appendix B, References and Resources.

PROGRAM EVALUATION AND REFINEMENT

The program development and implementation process outlined above will help you develop a successful TDM program. But you will want to periodically review your progress, measure it against your goals, and refine elements of the program that are not producing the intended result, or that are not compatible with changing circumstances of your employees or your company. In this stage of the TDM program, you are answering the questions, "did the TDM program work?" and "why or why not?" The primary reason to evaluate the program is to assess its effectiveness:

- Did the program reduce commuting trips?
- Which specific elements of the program influenced the change? and
- What program modifications would increase its future success?

The previously mentioned companion document, ***TDM Market Research and Evaluation Manual,*** outlines an evaluation process and describes the information you will need for the evaluation. Briefly, you should examine employees' travel patterns at a point when the program has been available for some time, and compare them against the baseline you developed prior to implementing the program. You also will want to ask employees, probably through a survey, about their awareness and opinions about commute alternatives, and the reasons they use their current travel mode.

Your evaluation also should examine any impacts on internal company operations, and review any changes in the external environment that could have contributed to changes in employees' travel patterns. Finally, estimate program costs and savings. Your evaluation also should examine the cost-effectiveness of the program, and individual program strategies and incentives. For this, you will need information on the total cost of the program, the cost of individual incentives or promotional activities, and any savings that resulted from the program.

5. SELECTING TDM STRATEGIES AND CALCULATING TRIP REDUCTION IMPACT

PURPOSE

This section of the manual introduces a procedure to help you develop and explore specific TDM program options. The procedure consists of a set of easy-to-use worksheets and look-up tables that estimate the impact various TDM programs could have on current [or future] traffic conditions at your site. The estimates in the tables were developed from a combination of empirical and analytic sources, including a predictive computer model, the TDM Evaluation Model, which was developed by COMSIS for the Federal Highway Administration (FHWA) as a special guidance tool.

The procedure uses a series of worksheets to help you identify and assess the effectiveness of various packages of alternative commute program options for your individual situation. The worksheets allow you to record your calculations and the results of each option for further scrutiny. By comparing the results of various combinations of options, you can examine the different ways by which your goal may be achieved, as well as to see what actions will be necessary to achieve your TDM goal. You likely will want to test a number of alternative TDM programs with similar impact potential, and then develop additional information on those programs to understand their full implications before moving forward with implementation.

As described in Chapter 4, you likely will measure your progress by one or more of the following measures:

- Attainment of a particular level of average vehicle occupancy.
- Reduction of daily vehicle trips to site, or restriction of vehicle trips to a particular level.
- Reduction of peak (hour or period) vehicle trips by some percentage or by some standard.

In some instances, you might be required to eliminate a certain number of vehicle trips from your site entirely. In this situation, it will be necessary for employees to change travel modes or to adopt new work patterns that eliminate the need to travel to the site on a given day. In other situations, it may be enough that you simply shift the trip to another, less-congested, time of day. Strategies like flexible work hours or extended work days (such as occur with compressed work weeks) have their primary impact in the time-shifting of trips. The procedure presented in this manual can be used to allow for investigation of both types of strategies, and estimate the impacts on total vehicle trips or peak-only vehicle trips.

OVERVIEW OF PROCEDURE

The procedure includes the following steps, as illustrated in Figure 1.

STEP 1: DEFINE EMPLOYMENT TYPE

You will first need to classify your site according to type and situation. Some of the impact estimates - particularly the modal choice strategies of the look-up tables - take into account whether your company's activity is primarily Office or ***Non-Office*** employment. Company size and location, per se, are not important factors in this methodology, although these are reflected to an important extent in the starting modal split.

STEP 2: IDENTIFY BASELINE TRAFFIC CONDITION

Traffic conditions at a site can be represented by the relationship between the number of employees traveling to your site and the corresponding number of vehicles. A simple index for this relationship is Average Vehicle Ridership (AVR), defined as the ratio of total employees reaching the site to the number of private vehicles they use to make the trips (see explanation of AVR below).

AVR vs. AVO

There are two indicies that are commonly used to reflect the travel efficiency of a particular modal split: Average Vehicle Occupany, or "AVO," and Average Vehicle Riderships, or "AVR."

AVO is the more traditional measure used by planners and traffic engineers, and is calculated as:

$$AVO = \frac{\text{Total persons in private vehicles}}{\text{Total private vehicle trips}}$$

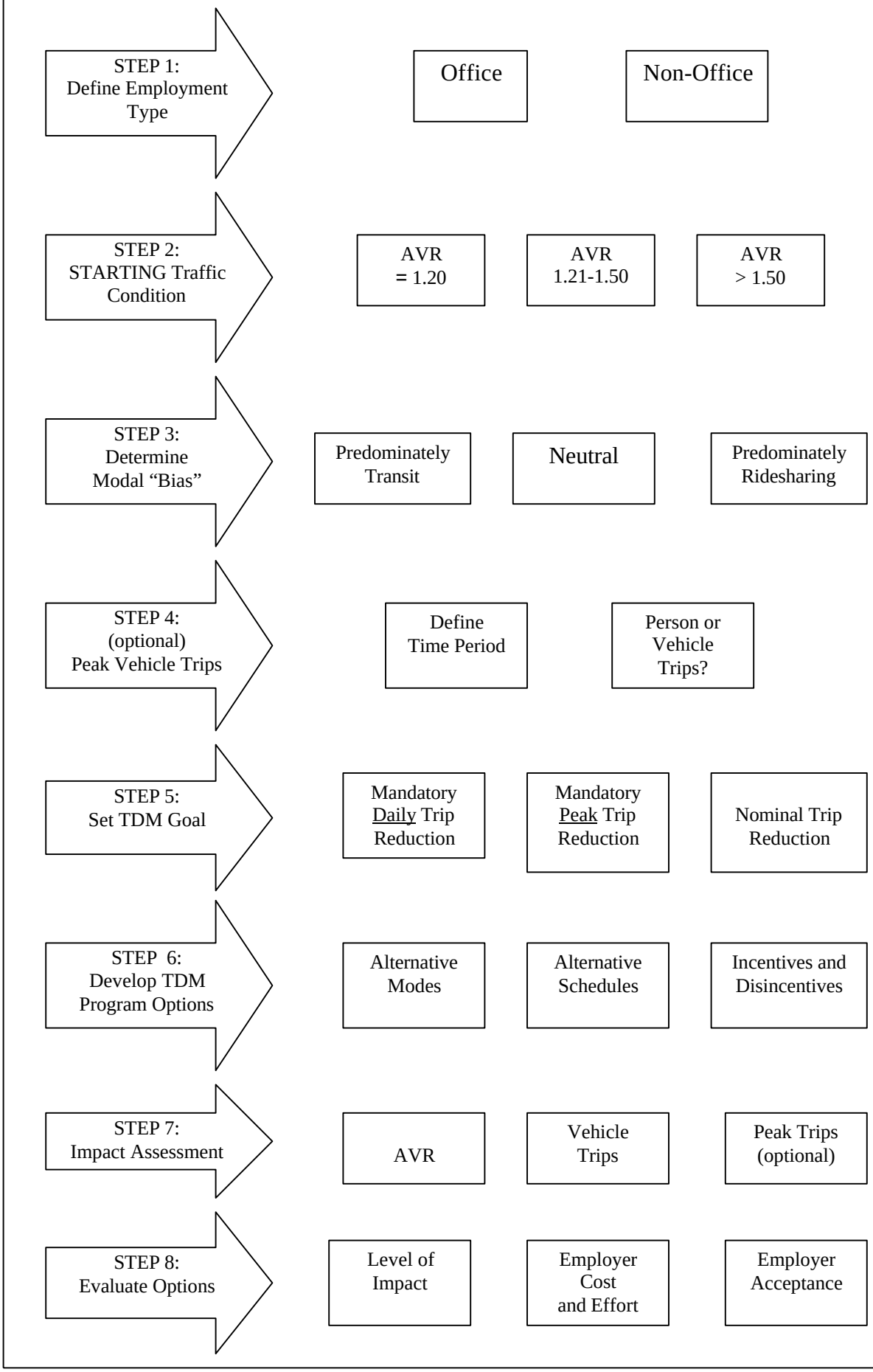
This measure gives a feel for efficiency in terms of private vehicle travel, but is deficient in that it misses travel by transit or non-motorized modes (bike, walk). Hence, a given site could have substantial trip reduction through transit, walk and bike use but show a relatively poor AVO.

Average Vehicle Ridership overcomes this by placing all travel groups in the equation:

$$AVR = \frac{\text{Total persons traveling}}{\text{Total private vehicle trips}}$$

This measures is the same as required of employers producing Trip Reduction Plans under Regulation XV in Southern California and under the U.S. Clean Air Act (1990).

FIGURE 1
Steps in TDM Program Evaluation Methodology



*Step **3:** DEFINE "MODAL BIAS"*

Because AVR is a composite measure which accounts for all travel modes, it is possible to achieve a given AVR, 1.3 for example, through different combinations of alternative modes, e.g. ridesharing or transit. Thus, you must also distinguish between AVR situations where:

- Most non-SOV employees arrive by transit,
- Most non-SOV employees rideshare,
- Transit and rideshare use are more evenly split.

When use of one alternative mode predominates at a site, the site has a "modal bias." For example, if most non-SOV employees use transit, the site has a transit modal bias, or is "transit favorable." If most non-SOV employees arrive by Carpool, the site is "rideshare favorable." If neither mode dominates, the site is "mode neutral." Since this "modal bias" affects the impact that different TDM strategies will have at the site, it is important to classify your site for this characteristic as well.

*STEP **4:** DETERMINE PEAK VEHICLE TRIPS (OPTIONAL)*

If you are responding to a trip reduction ordinance that requires *you particularly* to limit the number of trips during a specified peak hour or period, you will:

- Need to determine the current patterns of persons and vehicles traveling to your site relative to the conditions of the ordinance.
- The flexibility of your business operation to allow rearrangment of these arrival/departure schedules.

If you are not responding to a legal requirement, you may still have a desire to spread out your employee travel schedules to accomplish some or all of the travel relief in your program.

*STEP **5:** SET **TDM** GOAL*

Next, set a goal or target for the program. As discussed in Chapter 4, you probably have either a well-defined target set by regulation, or a more nominal target to satisfy an internal goal. Regardless of how the target is defined, there are two ways to use this evaluation procedure:

- Start with the target and identify combinations of strategies that afford the needed or desired trip reduction, or

- Start with alternative TDM strategy packages and ascertain what improvement in traffic conditions those packages will provide.

You will likely use the first method if you are developing the program in response to a legal or regulatory requirement and the second if you are considering TDM for a voluntary or self-motivated program, but the approaches can be used interchangeably.

STEP 6: DEVELOP TDM PROGRAM OPTIONS

Next, the procedure introduces different TDM program strategies for you to package into program options. A system of worksheets and look-up tables is provided to help in identifying strategy packages and estimating their impacts. The strategies fall into three general categories:

- Modal choice strategies, which encourage employees to shift from driving alone to other commute alternatives;

- Alternative work arrangements, which reduce the number of days employees travel to the worksite, and thus, the actual number of trips made to the site; and

- Work hours shifting strategies, which shift trips from the most congested times of the day to less-busy “off-peak” time periods.

STEP 7: PERFORM IMPACT ASSESSMENT

In this step, you will estimate the effectiveness of strategy packages. Effectiveness is indicated by increases in Average Vehicle Ridership, (AVR) and/or reductions in vehicle trips and/or person trips. You may combine strategies to achieve the desired trip reduction and program balance.

STEP 8: EVALUATE OPTIONS

Finally, compare the estimated impact of each package on vehicle trip-making, and on your TDM program goals. Special worksheets are provided to help you keep track of the test. Through this “menu” of options, you will be able to evaluate the effectiveness and acceptability of the different packages in complying with the goal or regulation.

APPLICATION OF PROCEDURE

This section provides step-by-step guidance in the purpose and use of the worksheets and took-up tables that make up the evaluation procedure.

STEP 1: DEFEINE YOUR EMPLOYMENT TYPE

The first step is to classify your company as either Office or Non-Office. Office situations are interpreted as substantially professional/white-collar jobs, with work schedules that fall within the daily peak travel periods. Office also includes fire, services, and government employment, covered by Standard Industrial Classification (SIC) Codes 6000 and above. Non-Office is interpreted as substantially blue collar or crafts/non-professional employment, with work schedules that may or may not fall within the traditional peak periods. This includes Construction, Manufacturing, Transportation, and Wholesale and Retail Trade, corresponding to all SIC codes below 6000.

*STEP 2: DEFINE YOUR BASELINE TRAFFIC CONDITIONS (STARTING **A VR)***

Using Worksheet 1, calculate the Average Vehicle Ridership at your site. AVR probably best reflects the vehicle usage of the population of employees who physically travel to the site on an average day, and you should use this definition unless required to use a different measure. AVR is most easily defined as the number of employees arriving at the worksite divided by the number of vehicles in which they arrive, but there are variations of this definition. For example:

- You could be required to account for all employees, including those who do not travel to the site;
- You might be required (or choose) to measure the average behavior over an entire work week;
- You might be interested in only those trips that occur during a specified period of the day, or a "peak hour."

The evaluation procedure is easily applied to a more restricted definition of AVR such as these; simply define the starting population and AVR accordingly, and the remainder of the technique is still applicable.

To calculate AVR you will need information on employees' travel mode choices. The best source for this information is an employee survey that asks employees how they traveled to the site on the specified day/time period. Travel mode options should include:

- Driving alone (includes taxi or being dropped off)
- Motorcycle
- Carpool (by number of occupants)
- Vanpool

WORKSHEET 1
Calculation of Average Vehicle Ridership (AVR)

	Total Employees Traveling to Site, by Mode		Total Vehicle Trips to Site
Drive Alone/Driven & Dropped Off		Divide by 1	
Motorcycle		Divide by 1	
Carpool, 2 Person		Divide by 2	
Carpool, 3 Person		Divide by 3	
Carpool, 4+ Person		Divide by 4 *(or count of # of vehicles)*	
Total Carpool	*	Divide by 2.5	
Vanpool		Divide by # of Vans *(or 12 if not known)*	
Buspool		Divide by # of Buses *(or 30 if not known)*	
Public Transit			None
Bicycle			None
Walk			None
Total Persons P =		**Total Vehicles V =**	

Average Vehicle Ridership (AVR):

$$AVR = \frac{P}{V} = \frac{\square}{\square} = \square$$

** Use this space to estimate carpool vehicle trips if an exact count by 2, 3, 4+ occupancy group is not available.*

- Buspool
- Public Transit
- Bicycle
- Walk

Although you might choose to conduct a more extensive survey for marketing purposes, a simple post card sized questionnaire administered to all employees is adequate for gathering AVR information. The companion guidance manual on Market Research and Evaluation offers assistance in design of these surveys.

It is likely some surveys will not be returned. For the most conservative estimate of trip reduction potential, treat non-responding employees as Drive Alone. Depending on the accuracy wanted or needed (which might be a specific regulatory requirement), you might validate the survey with physical vehicle occupancy counts. The modal percentages in Worksheet 1 then can be adjusted to fit the observed count. While less desirable, an intensive physical vehicle occupancy count may be an acceptable direct substitute for an employee survey.

Enter the number of employees using each mode, from the survey or other resources, into the appropriate boxes on Worksheet 1. Then perform the indicated calculations to obtain the number of vehicle trips in the second column. Note that the worksheet requests information on the number of carpooling employees by the size of carpool (i.e., two, three or four+ occupants). If you do not have this detail, divide the total number of carpoolers by two persons per vehicle. Although you might have some Carpools with more than two occupants, this will give you the most conservative result. Sum all person trips in column 1 and all vehicle trips in column 2, and obtain the AVR by dividing column 1 by column 2.

STEP 3: DEFINE YOUR MODAL "BIAS"

As described earlier, you will need to define the modal "bias" at your site, that is, whether the site is "transit favorable," "rideshare favorable," or "mode neutral." **Worksheet** 2 is provided to help you make this determination. Complete the following three steps:

1) Enter the total percent of employees using all alternative modes in the first box (AM),

2) In the second and third boxes (TR and RS), enter the percent of employees using transit (TR) and rideshare (RS) modes, respectively,

3) Divide the percent using transit (TR) by the percent using alternative modes (AM), and the percent using rideshare (RS) by the percent using alternative modes (AM).

WORKSHEET 2
Determination of Modal Bias

From Worksheet 1:

Total Percent of Employees Traveling to Site who use Alternative Modes (AM) *(All Methods except Drive Alone & Motorcycle)* — **AM** ____ %

Total Percent of Employees Using Public Transit (TR) — **TR** ____ %

Total Percent of Employees Using Rideshare Modes (RS) *(Carpool, Vanpool, Buspool)* — **RS** ____ %

Calculate:

$$\frac{TR}{AM} = \frac{\quad\%}{\quad\%} = \quad\%$$

$$\frac{RS}{AM} = \frac{\quad\%}{\quad\%} = \quad\%$$

If > 50%, Site is "Transit Favorable"	If Neither is > 50%, Site is "Mode Neutral"	If > 50%, Site is "Rideshare Favorable"
TR ☐ ✓	**MN** ☐ ✓	**RS** ☐ ✓

If transit comprises more than 50 percent of your percent alternate mode, your site is "transit favorable." If your percent alternative mode is more than 50 percent ridesharing, your site is "rideshare favorable." If neither transit nor ridesharing dominates, the site is "mode neutral." The look-up tables (provided later in this chapter) which furnish estimates of trip reduction impacts are divided into these three categories.

Note that falling into any of these preliminary categories does not mean you cannot implement opposite-mode strategies, but the impacts on AVR and other measures will be different.

STEP 4: CALCULATE PEAK VEHICLE TRIPS (OPTIONAL)

In some situations, you may want or need to reduce trips from a specific peak hour or peak period. Several existing TDM ordinances require employers to, for example, reduce morning peak-hour vehicle trips. Alternatively, if traffic at your site is particularly congested during a certain time period, you might find it valuable simply to shift some portion of that traffic to an earlier or later time.

The procedure outlined in this chapter can be used to assess both the overall impact of TDM strategies, and the impact specifically on peak-hour trip-making. This analysis step is optional, and your situation might not require this assessment. Although easy to incorporate, this step is recommended only for situations where trip shifting is an important issue. **Worksheet 3,** with the following five steps, is provided for this calculation:

1) First enter the ***total number of*** employees traveling to the site (P) on an average day, from Worksheet 1.

2) Then enter the ***time*** period you consider (or are required to consider) the peak hour or period.

3) Next, enter the ***number of employees*** arriving at the site during the peak period (PK); determine this through the employee survey or through a vehicle count.

4) Calculate the ***percentage of employees*** who arrive during the peak period by dividing PK by P.

5) Calculate ***peak period vehicle trips*** (PVT) by multiplying the number of vehicle trips (V) from Worksheet 1 by the PK percent.

WORKSHEET 3
Calculation of Peak Vehicle Trips (Optional)

From Worksheet 1:

Total Persons Traveling to Site **(P)** **P** [ ]

Total Daily One-way Vehicle Trips **(V)** **V** [ ]

Definition of Peak Condition:

☐ Peak Hour (7:30 - 8:30 AM or _____)

☐ Peak Period (6:00 - 10:00 AM or _____)

Just check box, nothing to enter

Number of Employees Traveling to Site During Defined Peak Hour/Period **(PK)** **PK** [ ]

Percent Arriving in Peak:

$$\text{PK \%} = \frac{\text{PK}}{\text{P}} = \frac{\text{[ ]}}{\text{[ ]}} = \text{[ ]}\ \%$$

Peak Vehicle Trips:

PVT = PK % x V = [ ] **x** [ ] **=** [ ]

STEP 5: SET TDM GOAL

To identify the appropriate type and intensity of your TDM program, you must first define your goal for the program. Your goal might be expressed as a target AVR, AVO, or APO, a certain reduction in SOV use, a certain increase in use of one or more alternate modes, a reduction in peak-hour vehicle trips, etc. As discussed in Chapter 4, your goal might be dictated by a regulation.

Most TDM goals can be reduced to a much simpler measure: percent *reduction in vehicle trips.* The worksheets and look-up tables used throughout this procedure relate TDM impacts in terms of "percent trip reduction." Thus, to assess the effectiveness of a strategy, you will need to estimate your initial number of trips and the percent trip reduction you are seeking.

Use **Worksheet** 4 to establish the trip reduction goal. The worksheet provides space to calculate your desired trip reduction from a comparison of present and target AVR (or AVO or APO); daily vehicle trips; or peak period vehicle trips. If your goal is to be based on another measure, you might still be able to use the equations in Worksheet 4 to arrive at a target trip reduction percentage.

If you are not required by a regulation to meet a specific goal, you still will find it helpful to establish some nominal goal to guide your analysis. Set an AVR or vehicle trip limit that you think you would like to achieve, and determine the percent vehicle trip reduction necessary to achieve, that level. Later on, as your familiarity with TDM grows, you might re-evaluate/re-establish this goal.

WORKSHEET 4
Establish Trip Reduction Targets

AVR Goal:

$$\frac{\frac{1}{AVR_p} - \frac{1}{AVR_t}}{\frac{1}{AVR_p}} = \frac{\frac{1}{\square} - \frac{1}{\square}}{\frac{1}{\square}} = \square\ \%$$

Desired Trip Reduction

Daily Trip Reduction Goal:

$$\frac{V_p - V_t}{V_p} = \frac{\square - \square}{\square} = \square\ \%$$

Desired Trip Reduction

Peak Period Trip Reduction Goal:

$$\frac{PV_p - PV_t}{PV_p} = \frac{\square - \square}{\square} = \square\ \%$$

Desired Trip Reduction

Note: p = present condition
t = target condition

STEP 6: DEVELOP TDM PROGRAM OPTIONS

After setting your TDM goal, begin the process of identifying TDM program packages that will help you meet the goal. As mentioned earlier in this chapter, there is probably more than one package of TDM strategies that will allow you to achieve your trip reduction goal. These packages could combine strategies that shift employees from SOV to alternative modes, strategies that reduce trips by shifting employees into alternative work hours arrangements, or strategies that shift employees' travel to less congested times of the day.

Worksheet 5, the TDM Impact Worksheet, directs you through the calculation for the impacts of each of these three strategy types. Further, if you use one of these worksheets for each "trial," that is, one for each unique program package you examine, it will help you keep track of the TDM packages you test, and allow you to readily compare the packages against each other later, during evaluation.

Define Starting Conditions - Label the trial number in the box on the upper right, enter the target trip reduction in the box on the upper left, and enter your starting AVR, Total Vehicle Trips, and (if used) Peak Vehicle Trips in the Starting Conditions box.

The worksheet leads you through the examination of Modal Shift Strategies, Alternate Work Arrangements, and Time Shift Actions. You can look at one strategy group alone, or combine two or three strategy groups in a single program trial. The worksheet will help you assess the impact contributed by each program element separately.

Modal Shift Strategies - Modal shift strategies are those that cause a change of mode, from driving alone to the alternative modes of transit, carpooling, and vanpooling. These strategies include three categories of actions:

- **Rideshare (Carpool and Vanpool) Program Support:** Information, promotion, and other supporting strategies implemented at a worksite to encourage employees' use of Carpools or vanpools.

- **Transit Program Support:** Information, promotion, and other supporting strategies implemented at a worksite to encourage employees' use of public transit service.

- **Economic Incentives:** Incentives that financially reward employees who use high-occupancy modes. These can be direct **subsidies** to users of high-occupancy modes, or **surcharges** imposed on SOV users. These strategies are distinct from the above two groups of supporting strategies.

WORKSHEET 5
TDM Impact Worksheet

Target Trip Reduction: _____%

Trial #: _____

Starting Conditions:

AVR1	VT1	PVT1
Average Vehicle Ridership	*Total Vehicle Trips*	*Peak Vehicle Trips*

Modal Shift Strategies:

Ride Share Level: ____
Transit Level: ____
Pricing Differential: ____

VTRm ____ *Vehicle Trip Reduction*

AVR2 = AVR / (1 - VTRm) = ____

VT2 = VT1 x (1 - VRTm) = ____

PVT2 = PVT1 x (1 - VRTm) = ____

Alternate Work Arrangements:

Compressed Work Weeks:

Pct 3/36		x 0.4 =	
Pct 4/40		x 0.2 =	
Pct 9/80		x 0.1 =	

Telecommute:

Pct 1 day		x 0.2 =	
Pct 2 days		x 0.4 =	
Pct 3 days		x 0.6 =	
Pct 4 days		x 0.8 =	
Pct 5 days		x 1.0 =	
Total Pct A.W.A.		**VTRa**	

AVR3 = AVR2 / (1 - VTRa) = ____

VT3 = VT2 x (1 - VRTa) = ____

PVT3 = PVT2 x (1 - VRTa) = ____

Time Shift Actions:

Flex-Time/Staggered Hours:

Pct Employees Moved Outside Defined Peak ____

Compressed Work Week:

Pct 3/36		x .60 =	
Pct 4/40		x .40 =	
Pct 9/80		x .10 =	
		VTRs	

AVR4 = No Change = ____

VT4 = No Change = ____

PVT4 = PVT3 x (1 - VRTs) = ____

Appendix A presents a series of look-up tables, labeled ***Modal Shift Reduction Factors,*** that provide estimates of the potential impacts of TDM strategies on employees' mode choice. The table also show the effect of various levels of these three sets of TDM strategies you can implement at your site." **Figure 2** shows one of these tables as an example.

The tables in the appendix are organized into groups based on the three classification criteria described earlier in this chapter:

- **Employer Type:** two groups - Office and Non-Office
- **Starting AVR:** three groups - < 1.21, 1.21 to 1.50, and > 1.50
- **Modal Balance:** three groups - Transit favorable, Rideshare favorable, and Neutral

The look-up tables are organized in sets of four subtables (two on each of two pages). Each group of four was developed for a unique combination of these three criteria, For example, the sample in Figure 2 applies to:

- Office Employers, with a
- Starting AVR of 1.21 to 1.50, and a
- Neutral Mode Balance

To use the tables, first find the group of four that corresponds to your situation. Within the tables are numbers (or "trip reduction factors") that represent the percentage vehicle trip reductions that would occur if a program of the described characteristics was implemented under the starting conditions you have identified.

Each table identifies the trip reduction that would occur with each of four levels of employer support for TDM. The four subtables differ by the ***level of financial incentive*** offered with the supporting strategies. These different "levels" of support and incentives are defined as follows:

Employer Transit Support Program: The employer offers various services and supporting measures to enhance the attractiveness of using transit:

Level 1: Provides an on-site transit information center and a transportation coordinator who commits 1/4 time to supplying information and encouraging transit use.

Level 2: Offers all features of Level 1 plus a policy of leniency in work hours (tolerate periodic late arrivals/early departures) to accommodate transit schedules.

FIGURE 2
Modal Shift Reduction Factors
(Sample Table)

Employer Type:	*Office*
Starting AVR:	**1.00 – 1.20**
Mode Balance:	Rideshare

VEHICLE TRIP REDUCTION (Percent)	*Financial Incentive Differential = $0*				
CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	0.0	0.2	0.5	1.5	2.0
Level 1	0.6	0.6	1.1	2.1	2.6
Level 2	1.6	1.5	2.1	3.0	3.5
Level 3	7.2	7.1	7.6	8.5	9.0
Level 4	11.1	11.1	11.6	12.5	12.9

VEHICLE TRIP REDUCTION (Percent)	*Financial Incentive Differential = $1*				
CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	5.9	6.1	6.5	7.8	8.5
Level 1	6.7	7.0	7.4	8.6	9.3
Level 2	7.9	8.2	8.6	9.8	10.5
Level 3	15.1	15.3	15.6	16.7	17.3
Level 4	19.1	20.1	20.4	21.4	22.0

Level 3: Offers all features and Levels 1 and 2 plus on-site transit pass sales and an increase of the coordinator role to 1/2 time.

Level 4: Offers all features and Levels 1, 2 and 3 plus a Guaranteed Ride Home program for transit users, and a full-time coordinator.

Employer Rideshare Support Program: The employer offers various incentives and services to enhance the attractiveness of using ridesharing options (carpooling and/or vanpooling):

Level 1: Provides information on carpool/vanpool opportunities, supports external matching programs, and dedicates a 1/4 - time transportation coordinator.

Level 2: Offers all features of Level 1 plus adoption of in-house sponsorship of matching services, and sponsorship of rideshare candidate get-togethers.

Level 3: Offers all features of Levels 1 and 2 plus a policy of leniency in departure/arrival times; provides preferential parking for pools, and extends coordinator role to 1/2 time. For Vanpools, also includes Vanpool development and operating assistance (such as loan guarantees, insurance assistance, or start-up subsidies), plus additional services like on-site van washing and servicing.

Level 4: Offers all features of Levels 1, 2 and 3 plus Guaranteed Ride Home and full-time coordinator. For Vanpools, includes major in-kind financial assistance such as favorable leasebacks, free maintenance and insurance, and empty-seat subsidies.

In a given table, therefore, you can compare the ***Percent Vehicle Trip Reduction*** produced with a wide range of levels of employer support for transit and ridesharing: programs that emphasize transit use, rideshare use, or any combination of the two. Note that the trip reduction estimates in the table assume that the level of effort for the program is compared to having "no program" currently in place. This is seldom the case. To account for existing support of commute alternatives, you must identify the trip reduction factor for the combination that corresponds most closely to what is in place currently, and subtract it from the factor for the level you wish to test in order to get the net effect.

The concept is the same in each of the four tables in each set. What distinguishes the four tables is the level of financial incentive offered to employees. The first table reflects no ($0) direct financial incentive in the employer program. Subsequent tables reflect an increasing level of financial motivation, from $1 to $4 per employee per day.

This financial incentive is expressed as a pricing differential; in other words, some combination of strategies that either rewards HOV users or penalizes SOV users to so that the ***net difference*** between the two users is the stated dollar amount. For example, a $2 differential could either be thought of as a $2 surcharge on SOV parking, a $2 daily subsidy to rideshare/transit users, or a combination $1 SOV charge and $1 HOV subsidy.

The tables can be applied in two ways. You can identify groups of strategies you might implement, and determine the trip reduction associated with each program. This is using the table "from the outside in." Or, you can define a trip reduction goal and identify TDM packages with trip reduction factors equal to or greater than the goal; using the table "from the inside out." Note that there are probably several combinations which will yield the same impact, offering tradeoffs between ridesharing, transit, and financial initiatives. Regardless of which method you use, you can compare the trip reduction impacts of various packages of strategies.

After identifying one or more options, go back to Worksheet 5 and describe your program selection on the right side of the Modal Shift Strategies box. Then calculate the revised performance, using the trip reduction factor for the selected TDM program, with the formulae and boxes provided.

Alternate Work Arrangements - The second category of TDM strategies in the TDM Impact Worksheet 5 deals with two forms of Alternate Work Schedules: compressed work weeks and telecommuting. These strategies eliminate physical trips to a worksite by reducing the number of days employees need to travel. In the process, of course, vehicle trips are also eliminated.

The estimation of the effect of these strategies is done directly in the worksheet, not through look-up tables as with the Modal Shift strategies. Enter, in the boxes on the left-hand side of the worksheet, the percentage of employees you expect to participate in any or all of these different work arrangements. Then complete the simple calculation to estimate the resulting reduction in vehicle trips on an average day.

Compressed work weeks reduce the number of days an employee must travel to the worksite, by effecting a longer work day. This has implications also on when the trip occurs, relative to the peak, and is discussed later. Generally, an employer will offer one, but not all of these options, though the technique permits evaluation of any combination.

The telecommuting option - working off-site one or more days per week - has trip reduction impacts which are directly related to the number of days per week that an employee telecommutes. Thus, it is necessary to assume not only the percentage of

employees who will telecommute, but the number of days they would be likely to do so.

It should be noted that the results for these strategies are heavily dependent upon your assumptions. If you assume a large percentage of your employees will use an alternative work arrangement if it is offered, your calculation will result in a large trip reduction. However, you should scrutinize this estimate very carefully. In Southern California, employers who offered such programs to employees showed very modest usage rates by employees. The following employee participation rates were observed:

Arrangement Offered	**Employees Using**
4/40 Week	6 %
3/36 Week	4 %
9/80 Week	2 %
Telecommute	2 %

Furthermore, it should be noted that, generally, onlv one of these alternative schedules was offered by a given employer. Bear in mind, therefore, that you should be realistic (and conservative) in projecting the percent of your employees who will participate in any of these program options if it is offered

After entering your assumptions, complete the calculations and total the two columns to determine the total percent of employees who would be expected to take part in these new work arrangements, and the resulting vehicle trip reduction (simply the sum of reductions from all arrangements). Use the total trip reduction from Alternate Work Arrangements (VTR) to compute the changes in AVR and vehicle trips on the right side of the table.

Note that the Mode Shift and the Alternate Work Arrangements are separate from each other in the table. In reality, there may be some interaction, with either strategy having an effect on the appeal of the other. However, these effects are not well-documented and are assumed here to be minimal.

Time Shift Actions: The third and final set of TDM strategies in the worksheet does not reduce trips, but affect only the time of travel. Their impact is simply to move vehicle trips out of the peak period. They do not increase vehicle occupancy or physically eliminate travel, hence their only impact on efficiency of travel is to lessen peak hour/peak period trip loads. This can be, however, an important supporting

strategy, depending on your need and/or the wording of a legal requirement. Worksheet 5 accommodates two types of actions:

Flexible or Staggered Work Hours: These policies shift employees' arrival or departure times to less-congested times. For this strategy, estimate how many employees would be shifted outside the peak period if a flexible hour or staggered hour policy were implemented. As with alternative work arrangements, it is important to be realistic in what can be achieved with these strategies.

Compressed Work Weeks: The compressed work week has two effects. As discussed earlier, it reduces the number of daily trips to a site, but it also shifts trips by time of day to the extent that the work day itself is elongated. For example, the work day for a 3/36 week is 12 hours long. Thus, it is likely the commute trip will fall outside both the morning and evening peak hours, and produce an average daily trip reduction of 0.6 (trip shift effect only). Similarly, the 4/40 week has a IO-hour day, and the commute trip again misses both peaks an average of four days per week, resulting in a vehicle shift trip reduction of 0.4. With the 9/80 week, the work day is nine-hours long, resulting in the shaving of 1 peak per day an average of four and one half days per week, or 0.1.

To use this section of the worksheet, enter your estimates for participation in these programs and compute the vehicle shift trip reduction on the left side of the worksheet. Then move to the right side to complete the assessment of the impact on travel to the site. Note that the only impact credited from these particular strategies is on Peak Vehicle Trips; AVR and daily vehicle trips are assumed to be unchanged.

STEP 7: ESTIMATE TRIP REDUCTION IMPACTS

After completing a trial and determining the impact of a particular package of TDM strategies, you probably will want to develop and evaluate several other program options, with different levels of employer support actions, levels of financial incentives, and different types and levels of alternate work arrangements. This could easily move toward a large combination of alternatives.

To keep track of the trials and allow easy comparison among trials, use the Summary Table provided in Worksheet 6. Its use is largely self-explanatory. Enter the number of the trial, record (simply with check marks in the boxes provided) what major strategies were considered, and indicate the estimated impact on AVR and daily and peak vehicle trips. Space is provided in each trial line to allow for calculation of the percentage reduction relative to the starting conditions.

This table is a good place to organize your thoughts about the direction of strategies and programs, and to begin the process of synthesizing your findings toward an eventual selection of key program elements.

WORKSHEET 6
TDM Program Test Summary Table

Trial	Mode Shift Actions	Alternate Work Arrange-ments	Time Shift Actions	AVR	VT	PVT
Starting Conditions						
1	☐✓	☐✓	☐✓			
			Percent Change →			
2	☐✓	☐✓	☐✓			
			Percent Change →			
3	☐✓	☐✓	☐✓			
			Percent Change →			
4	☐✓	☐✓	☐✓			
			Percent Change →			
5	☐✓	☐✓	☐✓			
			Percent Change →			
6	☐✓	☐✓	☐✓			
			Percent Change →			
7	☐✓	☐✓	☐✓			
			Percent Change →			
8	☐✓	☐✓	☐✓			
			Percent Change →			
9	☐✓	☐✓	☐✓			
			Percent Change →			
10	☐✓	☐✓	☐✓			
			Percent Change →			

EXAMPLE APPLICATION

To review the process outlined above and better understand the use of the worksheets, consider the following example and accompanying completed sample worksheets:

> You represent an insurance company with 1,000 employees, and you are required to raise your Average Vehicle Ridership to 1.50. From a survey of employees, you find your current AVR is 1.06. There is no transit service to the site, so all those who commute by means other than SOV are in Carpools, plus one 7-person vanpool. A small number walk or bike to work, but generally the site is not accessible by walking or biking. Parking is in a surface lot, with no restrictions on space availability or cost to the employee.

Step 1: Define Employment Type

You note first that your SIC Code qualifies you as an "office" type employer for the purposes of this analysis and the TDM impact estimates.

Step 2: Define Baseline Traffic Candidates

To ascertain what TDM program options will be useful in attaining the AVR target, you survey your employees and determine current modal split. You enter the survey results in Worksheet 1, as shown in Figure 3, and then compute a current AVR of 1.06.

FIGURE 3
Worksheet 1: Calculation of Average Vehicle Ridership (AVR)

SAMPLE

	Total Employees Traveling to Site, by Mode		Total Vehicle Trips to Site
Drive Alone/Driven & Dropped Off	901	Divide by 1	901
Motorcycle	10	Divide by 1	10
Carpool, 2 Person	50	Divide by 2	25
Carpool, 3 Person	12	Divide by 3	4
Carpool, 4+ Person		Divide by 4 *(or count of # of vehicles)*	
Total Carpool	*	Divide by 2.5	
Vanpool	7	Divide by # of Vans *(or 12 if not known)*	1
Buspool		Divide by # of Buses *(or 30 if not known)*	
Public Transit			None
Bicycle	8		None
Walk	12		None
Total Persons P =	1,000	**Total Vehicles V =**	941

Average Vehicle Ridership (AVR):

$$AVR = \frac{P}{V} = \frac{1{,}000}{941} = 1.06$$

** Use this space to estimate carpool vehicle trips if an exact count by 2, 3, 4+ occupancy group is not available.*

Step 3: Determine Modal Bias

With no transit service available, the current modal balance will favor ridesharing, as will any supporting strategy you could apply. For demonstration, you complete Worksheet 2, **as shown in Figure** 4, which shows that 78 percent of your alternate mode share does indeed come from carpool/vanpool ridesharing modes.

Step 4: Determine Peak Vehicle Trip Reduction

You realize that this entire reduction must occur through the physical reduction of vehicle trips; simply shifting trips to another time period is not acceptable under the regulation.

FIGURE 4

SAMPLE

Worksheet 2:
Determination of Modal Bias

From Worksheet 1:

Total Percent of Employees Traveling to Site who use Alternative Modes (AM) *(All Methods except Drive Alone & Motorcycle)* — **AM 8.9%**

Total Percent of Employees Using Public Transit (TR) — TR 0%

Total Percent of Employees Using Rideshare Modes (RS) *(Carpool, Vanpool, Buspool)* — RS 6.9 %

Calculate: .

$$\frac{TR}{AM} = \frac{0\ \%}{8.9\ \%} = 0\ \%$$

$$\frac{RS}{AM} = \frac{6.9\ \%}{8.9\ \%} = 78\ \%$$

If > 50%, Site is "Transit Favorable"	If Neither is > 50%, Site is "Mode Neutral"	If > 50%, Site is "Rideshare Favorable"
TR ☐	MN	RS ☑

Step 5: Set TDM Program Goal

Next, calculate the percent trip reduction you need to reach the target of 1.5, using Worksheet **4, as shown in Figure** 5. Using only the AVR requirement as a guide, you determine you need to reduce daily vehicle trips to the site by 29.3 percent.

FIGURE 5

SAMPLE

Worksheet 4:
Establish Trip Reduction Targets

AVR Goal:

$$\frac{\frac{1}{AVR_p} - \frac{1}{AVR_t}}{\frac{1}{AVR_p}} = \frac{\frac{1}{1.06} - \frac{1}{1.50}}{\frac{1}{1.06}} = 29.3\%$$

Desired Trip Reduction

Daily Trip Reduction Goal:

$$\frac{V_p - V_t}{V_p} = \frac{\square - \square}{\square} = \square\%$$

Desired Trip Reduction

Peak Period Trip Reduction Goal:

$$\frac{PV_p - PV_t}{PV_p} = \frac{\square - \square}{\square} = \square\%$$

Desired Trip Reduction

Note: p = present condition
t = target condition

Step 6: Develop TDM Program Options

Next, you explore various packages of TDM strategies, beginning with Modal Shift Strategies. You turn to the look-up tables in Appendix A and find the tables that apply to **Office Employer, Starting** AVR 1.0 - 1.2, and with **Modal Balance** for **Rideshare.** A copy of this table set is shown on pages 61 and 62 as Exhibit A.

You first assess whether the entire trip reduction can be accomplished through Modal Shift strategies. You inspect the first table in Exhibit A, with no financial measures, and discover that there is no combination of employer support actions which will yield the necessary trip reduction. So, from the start, you realize you will have to move on to subsequent tables which include financial incentives.

You also note that none of the Transit Program Support measures can be considered, since there is no transit service to the site. So your choices are limited to Rideshare Program Support and Financial Incentives/Disincentives. Upon inspecting the subsequent tables with increasing application of pricing, you discover you must provide at least a $2 daily differential before you reach an acceptable range of trip reduction.

The first real option, circled in the example as Trial 1, is in the third table of Exhibit A, where a Level 4 Wideshare Support Program is mated with a $2 daily pricing differential (optional combination of HOV subsidies or SOV surcharges). Because Level 4 is a very extensive support effort, you also consider the options in the fourth table, where the same trip reduction can be achieved with a lower Rideshare Support Program, Level 3, but with the application of a $3 pricing differential. You select this 32.5 percent reduction option as Trial 2.

Now you go to the TDM Impact Worksheet 5 and register the choice from the Modal Shift table for Trial 1, shown as **Figure 6,** and on a separate worksheet, for Trial 2, **shown as Figure 7.** You calculate the associated change in AVR and vehicle trips based on the trip reduction indicated for the strategy package. The selection of strategies for Trial 1 yields a new AVR of 1.50 and a reduction in vehicle trips from 941 to 667. Trial 2 yields an AVR of 1.57 and a reduction in vehicle trips from 941 to 635.

To keep a running tally of the effects of the various trials, you post the results of these two trials to the Test Summary Worksheet 6, shown as Figure 8. You indicate that Trials 1 and 2 included only Mode Shift Strategies, record the AVR and vehicle trip reduction for these trials, and calculate the percentage improvement the trials produce.

FIGURE 6
Worksheet 5: TDM Impact Worksheet

SAMPLE

Target Trip Reduction: 29.3 %

Trial #: 1

Starting Conditions:

AVR1	VT1	PVT1
1.06	941	
Average Vehicle Ridership	*Total Vehicle Trips*	*Peak Vehicle Trips*

Modal Shift Strategies:

Ride Share Level: 4
Transit Level: 0
Pricing Differential: $2

VTRm = 29.1 *Vehicle Trip Reduction*

AVR2 = AVR / (1 - VTRm) = 1.50

VT2 = VT1 x (1 - VRTm) = 667

PVT2 = PVT1 x (1 - VRTm) =

Alternate Work Arrangements:

Compressed Work Weeks:

Pct 3/36		x 0.4 =	
Pct 4/40		x 0.2 =	
Pct 9/80		x 0.1 =	

Telecommute:

Pct 1 day		x 0.2 =	
Pct 2 days		x 0.4 =	
Pct 3 days		x 0.6 =	
Pct 4 days		x 0.8 =	
Pct 5 days		x 1.0 =	
Total Pct A.W.A.		VTRa	

AVR3 = AVR2 / (1 - VTRa) =

VT3 = VT2 x (1 - VRTa) =

PVT3 = PVT2 x (1 - VRTa) =

Time Shift Actions:

Flex-Time/Staggered Hours:

Pct Employees Moved Outside Defined Peak

Compressed Work Week:

Pct 3/36		x .60 =	
Pct 4/40		x .40 =	
Pct 9/80		x .10 =	
		VTRs	

AVR4 = No Change =

VT4 = No Change =

PVT4 = PVT3 x (1 - VRTs) =

EXHIBIT A: Modal Shift Trip Reduction Factors

Employer Type:	**Office**
Starting AVR:	**1.00 – 1.20**
Mode Balance:	**Rideshare**

VEHICLE TRIP REDUCTION: *(Percent)*

Financial Incentive Differential = $0

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	0.0	0.2	0.5	1.5	2.0
Level 1	0.6	0.6	1.1	2.1	2.6
Level 2	1.6	1.5	2.1	3.0	3.5
Level 3	7.2	7.1	7.6	6.5	9.0
Level 4	11.1	11.1	11.6	12.5	12.9

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $1

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	5.9	6.1	6.5	7.8	8.5
Level 1	6.7	7.0	7.4	8.6	9.3
Level 2	7.9	8.2	8.6	9.8	10.5
Level 3	15.1	15.3	15.6	16.7	17.3
Level 4	19.1	20.1	20.4	21.4	22.0

Trial #4

EXHIBIT A (continued)

Employer Type:	**Office**
Starting AVR:	**1.00 – 1.20**
Mode Balance:	**Rideshare**

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $2

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	13.0	13.4	13.8	15.4	16.2
Level 1	14.1	14.4	14.8	16.4	17.1
Level 2	15.5	15.8	16.3	17.8	18.5
Level 3	23.8	24.1	24.5	25.7	26.3
Level 4	29.1	29.4	29.7	30.8	31.4

Trial #3

Trial #1

VEHICLE TRIP, REDUCTION (Percent)

Financial Incentive Differential = $3

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	20.9	21.2	21.7	23.5	24.4
Level 1	22.0	22.3	22.9	24.6	25.4
Level 2	23.6	24.0	24.4	26.1	26.9
Level 3	32.5	32.7	33.1	34.4	35.1
Level 4	37.8	38.0	38.4	39.5	40.1

Trial #2

FIGURE 7
Worksheet 5: TDM Impact Worksheet

SAMPLE

Target Trip Reduction: 29.3 %

Trial #: 2

Starting Conditions:

AVR1	VT1	PVT1
Average Vehicle Ridership	*Total Vehicle Trips*	*Peak Vehicle Trips*

Modal Shift Strategies:

Ride Share Level:	3
Transit Level:	0
Pricing Differential:	$3
VTRm	32.5

Vehicle Trip Reduction

AVR2 = AVR / (1 - VTRm) = 1.57

VT2 = VT1 x (1 - VRTm) = 635

PVT2 = PVT1 x (1 - VRTm) =

Alternate Work Arrangements:

Compressed Work Weeks:

Pct 3/36		x 0.4 =
Pct 4/40		x 0.2 =
Pct 9/80		x 0.1 =

Telecommute:

Pct 1 day		x 0.2 =
Pct 2 days		x 0.4 =
Pct 3 days		x 0.6 =
Pct 4 days		x 0.8 =
Pct 5 days		x 1.0 =
Total Pct A.W.A.		VTRa

AVR3 = AVR2 / (1 - VTRa) =

VT3 = VT2 x (1 - VRTa) =

PVT3 = PVT2 x (1 - VRTa) =

Time Shift Actions:

Flex-Time/Staggered Hours:

Pct Employees Moved Outside Defined Peak

Compressed Work Week:

Pct 3/36		x .60 =
Pct 4/40		x .40 =
Pct 9/80		x .10 =
		VTRs

AVR4 = No Change =

VT4 = No Change =

PVT4 = PVT3 x (1 - VRTs) =

FIGURE 8

SAMPLE

Worksheet 6:
TDM Program Test Summary Table

Trial	Mode Shift Actions	Alternate Work Arrange-ments	Time Shift Actions	AVR	VT	PVT
Starting Conditions				1.06	941	
1	☑ ✓	☐ ✓	☐ ✓	1.50	667	
			Percent Change →	41.5	-29.1	
2	☑ ✓	☐ ✓	☐ ✓	1.57	635	
			Percent Change →	48.1	-32.5	
3	☑ ✓	☑ ✓	☐ ✓	1.47	680	
			Percent Change →	38.7	-27.7	
4	☑ ✓	☑ ✓	☐ ✓	1.46	685	
			Percent Change →	37.7	-27.2	
5	☐ ✓	☐ ✓	☐ ✓			
			Percent Change →			
6	☐ ✓	☐ ✓	☐ ✓			
			Percent Change →			
7	☐ ✓	☐ ✓	☐ ✓			
			Percent Change →			
8	☐ ✓	☐ ✓	☐ ✓			
			Percent Change →			
9	☐ ✓	☐ ✓	☐ ✓			
			Percent Change →			
10	☐ ✓	☐ ✓	☐ ✓			
			Percent Change →			

Next, you try a TDM package which includes Alternate Work Arrangements to reduce the effort and financial support that would be needed for a program based purely on modal shift strategies. In Trial **3, Figure 9,** you test a program in which 6 percent of your employees would be placed on a 4/40 work schedule, and 10 percent of employees would be allowed to telecommute two days per week. These combined actions yield a 5.2 percent trip reduction; still a far cry from the 29.3 percent target you must achieve. Thus, you must make up 24.1 percent (29.3 percent - 5.2 percent) from modal shift strategies, since time shifting is not an acceptable alternative.

To make up the difference, you re-enter the modal shift tables, looking for a trip reduction factor of 24.1 percent or greater. You choose a combination of a Level 3 Rideshare program and a $2 financial incentive, which will produce a trip reduction of 23.8 percent. Using Worksheet 5, you compute a projected AVR of 1.47, which might be made to be acceptable.

As a fourth trial **shown in Figure** 10, you consider a program in which your entire staff shifts to a 9/80 work week system. Again using Worksheet 5, you determine this would produce a 10 percent trip reduction, still short of the goal, leaving a remaining 19.3 percent to meet from modal shift strategies. You find you can produce this reduction through a Level 4 Rideshare program coupled with a $1 daily financial incentive. The result of this program is an AVR of 1.46, which again, may prove to be made acceptable.

You can continue this process for as many trials as you feel are necessary to establish the full range of options. With time, you develop a “feel” for the relative impacts of different classes and levels of strategies, and begin to home in on the most likely options. At some point, then, you explore these options, blend in an assessment of what it would cost to implement some of the strategies (especially the rideshare support), weigh the implications of the financial strategies (seeing it obvious that some measure of pricing is inevitable), and select and support the most balanced, cost-effective program.

FIGURE 9
Worksheet 5: TDM Impact Worksheet

SAMPLE

Target Trip Reduction: 29.3 %

Trial #: 3

Starting Conditions:

AVR1	VT1	PVT1
1.06	941	
Average Vehicle Ridership	*Total Vehicle Trips*	*Peak Vehicle Trips*

Modal Shift Strategies:

Ride Share Level: 3
Transit Level: 0
Pricing Differential: $2

VTRm = 23.8 *Vehicle Trip Reduction*

AVR2 = AVR / (1 - VTRm) = 1.39
VT2 = VT1 x (1 - VRTm) = 717
PVT2 = PVT1 x (1 - VRTm) =

Alternate Work Arrangements:

Compressed Work Weeks:

Pct 3/36		x 0.4 =	
Pct 4/40	6%	x 0.2 =	1.2
Pct 9/80		x 0.1 =	

Telecommute:

Pct 1 day		x 0.2 =	
Pct 2 days	10%	x 0.4 =	4.0
Pct 3 days		x 0.6 =	
Pct 4 days		x 0.8 =	
Pct 5 days		x 1.0 =	
Total Pct A.W.A.	16%	VTRa	5.2

AVR3 = AVR2 / (1 - VTRa) = 1.47
VT3 = VT2 x (1 - VRTa) = 680
PVT3 = PVT2 x (1 - VRTa) =

Time Shift Actions:

Flex-Time/Staggered Hours:

Pct Employees Moved Outside Defined Peak:

Compressed Work Week:

Pct 3/36		x .60 =	
Pct 4/40		x .40 =	
Pct 9/80		x .10 =	
		VTRs	

AVR4 = No Change =
VT4 = No Change =
PVT4 = PVT3 x (1 - VRTs) =

FIGURE 1O
Worksheet 5: TDM Impact Worksheet

SAMPLE

Target Trip Reduction: 29.3%

Trial #: 4

Starting Conditions:

AVR1	VT1	PVT1
1.06	941	
Average Vehicle Ridership	*Total Vehicle Trips*	*Peak Vehicle Trips*

Modal Shift Strategies:

Ride Share Level: 4
Transit Level: 0
Pricing Differential: $1

VTRm: 19.1 *Vehicle Trip Reduction*

AVR2 = AVR / (1 - VTRm) = 1.31

VT2 = VT1x(1-VRTm) = 761

PVT2 = PVT1 x (1 - VRTm) = _____

Alternate WorK Arrangements:

Compressed Work Weeks:

Pct 3/36	_____	x 0.4	_____
Pct 4/40	_____	x 0.2=	_____
Pct 9/80	100%	x0.1 =	100

Telecommute:

Pct 1 day	_____	x 0.2 =
Pct 2 days	_____	x 0.4 =
Pct 3 days	_____	x 0.6 =
Pct 4 days	_____	x 0.8 =
Pct 5 days	_____	x 1.0 =

Total Pct A.W.A. 100% 10.0

AVR3 = AVR2 / (1-VTRa) = 1.46

VT3 = VT2 x (1 - VRTa) = 685

PVT3 = PVT2 x (1 - VRTa) = _____

Time Shift Actions:

Flex-Time/Staggered Hours:

Pct Employees Moved Outside Defined Peak _____

Compressed Work Week:

Pct 3/36	_____	x.60 =
Pct 4/40	_____	x.40=
Pct 9/80	_____	x.10=

VTRs _____

AVR4 = No Change

VT4 = No Change =

PVT4 = PVT3 x (1 - VRTs) = _____

APPENDIX A

MODAL SHIFT

TRIP REDUCTION FACTORS

INSTRUCTIONS TO THE USER

To use these tables, follow these steps:

Step 1: Know your starting conditions to find the appropriate table group (index system in upper right hand boss):

Type Employer:	Office or Non-Office
Starting AVR:	1 .OO to 1.20, 1.21 to 1.50, over 1.50 (from Worksheet 1)
Modal Balance:	Transit, Rideshare, or Neutral (from Worksheet 3)

Proceed to that series of four (4) tables to explore your options.

Step 2: Select a level of financial incentive: SO, $1, $2 or $3. If unclear, start with $0 and see if you can satisfactorily achieve your effect without incentives.

Step 3: Within a selected table (for given financial incentive level), explore different combinations of Transit and Rideshare (CP/VP) program support. Numbers in table are vehicle trip reduction percentages.

Step 4: Note that a number of contributions of Transit and Rideshare Support and Financial Incentive Level will generally achieve your goal. Use the tables to explore the ranges of options available to vou.

Modal Shift Trip Reduction Factors

Employer Type:	*Office*
Starting AVR:	*1.00 - 1.20*
Mode Balance:	*Rideshare*

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $0

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	0.0	0.2	0.5	1.5	2.0
Level 1	0.6	0.6	1.1	2.1	2.6
Level 2	1.6	1.5	2.1	3.0	3.5
Level 3	7.2	7.1	7.6	8.5	9.0
Level 4	11.1	11.1	11.6	12.5	12.9

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $1

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	5.9	6.1	6.5	7.8	8.5
Level 1	6.7	7.0	7.4	8.6	9.3
Level 2	7.9	8.2	8.6	9.8	10.5
Level 3	15.1	15.3	15.6	16.7	17.3
Level 4	19.1	20.1	20.4	21.4	22.0

Modal Shift Trip Reduction Factors

Employer Type:	*Office*
Starting AVR:	*1.00 – 1.20*
Mode Balance:	*Rideshare*

VEHICLE TRIP REDUCTION (Percent)	*Financial Incentive Differential = $2*				
CP & VP PROGRAM SUPPORT	**TRANSIT PROGRAM SUPPORT**				
	Level 0	**Level 1**	**Level 2**	**Level 3**	**Level 4**
Level 0	13.0	13.4	13.8	15.4	16.2
Level 1	14.1	14.4	14.8	16.4	17.1
Level 2	15.5	15.8	16.3	17.8	18.5
Level 3	23.8	24.1	24.5	25.7	26.3
Level 4	29.1	29.4	29.7	30.8	31.4

VEHICLE TRIP REDUCTION (Percent)	*Financial Incentive Differential = $3*				
CP & VP PROGRAM SUPPORT	**TRANSIT PROGRAM SUPPORT**				
	Level 0	**Level 1**	**Level 2**	**Level 3**	**Level 4**
Level 0	20.9	21.2	21.7	23.5	24.4
Level 1	22.0	22.3	22.9	24.6	25.4
Level 2	23.6	24.0	24.4	26.1	26.9
Level 3	32.5	32.7	33.1	34.4	35.1
Level 4	37.8	38.0	38.4	39.5	40.1

Modal Shift Trip Reduction Factors

Employer Type:	*Office*
Starting AVR:	*1.00 – 1.20*
Mode Balance:	*Neutral*

VEHICLE TRIP REDUCTION (Percent)

Financial Incen tive Differential = $0

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	0.0	0.2	0.5	1.6	2.2
Level 1	0.6	0.6	1.1	2.2	2.7
Level 2	1.5	1.5	2.0	3.1	3.6
Level 3	6.9	6.9	*7.4*	*8.4*	*8.9*
Level 4	10.8	10.8	11.3	12.2	12.7

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $1

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	6.0	6.3	6.8	8.2	8.9
Level 1	6.9	7.2	7.6	9.0	9.7
Level 2	8.1	8.4	8.8	10.2	10.9
Level 3	15.2	15.5	15.9	17.1	17.7
Level 4	20.1	20.3	20.6	21.8	22.4

Modal Shift Trip Reduction Factors

Employer Type:	*Office*
Starting AVR:	*1.00 - 1.20*
Mode Balance:	*Neutral*

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $2

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	13.9	14.2	14.8	16.6	17.5
Level 1	14.9	15.3	15.8	17.6	18.4
Level 2	16.4	16.8	17.3	19.0	19.9
Level 3	25.0	25.3	25.8	27.2	27.9
Level 4	30.5	30.7	31.1	32.4	33.0

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $3

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	23.1	23.5	24.1	26.2	27.2
Level 1	24.3	24.7	25.3	27.3	28.3
Level 2	26.0	26.4	27.0	29.0	29.9
Level 3	35.4	35.7	36.1	37.6	38.4
Level 4	40.9	41.2	41.6	42.8	43.5

Modal Shift Trip Reduction Factors

Employer Type:	*Office*
Starting AVR:	*1.00 – 1.20*
Mode Balance:	Transit

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $0

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	0.0	0.2	0.5	1.6	2.2
Level 1	0.6	0.6	1.1	2.2	2.8
Level 2	1.5	1.5	2.0	3.1	3.7
Level 3	6.9	6.9	7.4	8.4	9.0
Level 4	10.8	10.8	11.3	12.3	12.7

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $1

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	6.1	6.4	6.8	8.3	9.1
Level 1	6.9	7.2	7.7	9.1	9.9
Level 2	8.2	8.5	8.9	10.3	11.0
Level 3	15.4	15.6	16.0	17.3	17.9
Level 4	20.3	20.5	20.8	22.0	22.6

Modal Shift Trip Reduction Factors

Employer Type:	***Office***
Starting AVR:	***1.00- 1.20***
Mode Balance:	***Transit***

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $2

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	14.1	14.5	15.0	16.9	17.9
Level 1	15.2	15.6	16.1	18.0	18.9
Level 2	16.8	17.1	17.7	19.4	20.3
Level 3	25.5	25.8	26.3	27.8	28.5
Level 4	31.1	31.4	31.7	33.0	33.7

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $3

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	23.8	24.3	24.9	27.1	28.2
Level 1	25.1	25.5	26.2	28.3	29.3
Level 2	26.9	27.3	27.9	30.0	31.0
Level 3	36.5	36.8	37.3	38.9	39.6
Level 4	42.2	42.4	42.8	44.1	44.8

Modal Shift Trip Reduction Factors

Employer Type:	Office
Starting AVR:	1.21 – 1.50
Mode Balance:	Rideshare

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $0

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	0.0	0.2	0.5	1.6	2.1
Level 1	0.6	0.6	1.2	2.2	2.7
Level 2	1.6	1.6	2.1	3.2	3.7
Level 3	7.4	7.3	7.9	8.8	9.3
Level 4	11.5	11.4	11.9	12.8	13.3

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $1

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	10.5	10.7	11.1	12.3	12.9
Level 1	11.2	11.5	11.8	13.0	13.5
Level 2	12.3	12.5	12.8	14.0	14.6
Level 3	18.5	18.7	19.0	20.0	20.5
Level 4	22.7	22.9	23.2	24.1	24.6

Modal Shift Trip Reduction Factors

Employer Type:	*Office*
Starting AVR:	*1.21 - 1.50*
Mode Balance:	*Rideshare*

VEHICLE TRIP REDUCTION
(Percent)

Financial Incentive
Differential = $2

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	20.8	21.0	21.4	22.6	23.2
Level 1	21.5	21.7	22.1	23.3	23.9
level 2	22.5	22.7	23.1	24.3	24.9
Level 3	28.6	28.8	29.1	30.2	30.7
Level 4	32.7	32.9	33.2	34.1	34.6

VEHICLE TRIP REDUCTION
(Percent)

Financial Incentive
Differential = $3

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	29.6	29.9	30.2	31.4	32.0
Level i	30.3	30.5	30.9	32.1	32.7
Level 2	31.3	31.5	31.8	33.0	33.6
Level 3	36.9	37.1	37.4	38.4	38.9
Level 4	40.6	40.8	41.1	42.0	42.4

Modal Shift Trip Reduction Factors

Employer Type:	***Office***
Starting AVR:	***1.21 – 1.50***
Mode Balance:	***Neutral***

VEHICLE TRIP REDUCTION (Percent)					***Financial Incen tive Differential = $0***
CP & VP PROGRAM SUPPORT	**TRANSIT PROGRAM SUPPORT**				
	Level 0	**Level 1**	**Level 2**	**Level 3**	**Level 4**
Level 0	0.0	0.2	0.6	1.8	2.4
Level 1	0.6	0.6	1.2	2.3	2.9
Level 2	1.4	1.5	2.0	3.2	3.8
Level 3	*6.6*	*6.7*	*7.2*	*8.3*	*8.8*
Level 4	10.3	*10.4*	10.9	11.9	12.4

VEHICLE TRIP REDUCTION (Percent)					***Financial Incentive Differential = $1***
CP & VP PROGRAM SUPPORT	**TRANSIT PROGRAM SUPPORT**				
	Level 0	**Level 1**	**Level 2**	**Level 3**	**Level 4**
Level 0	11.4	11.6	12.1	13.4	14.1
Level 1	12.0	12.3	12.7	14.0	14.7
Level 2	12.9	13.2	13.6	14.9	15.6
Level 3	18.7	18.9	19.3	20.5	21.1
Level 4	22.6	22.8	23.2	24.3	24.9

Modal Shift Trip Reduction Factors

Employer Type:	***Office***
Starting AVR:	***1.21 – 1.50***
Mode Balance:	***Neutral***

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $2

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	23.1	23.4	23.9	25.3	26.0
Level 1	23.8	24.0	24.5	25.9	26.6
Level 2	24.7	25.0	25.4	26.8	27.5
Level 3	30.3	30.6	30.9	32.2	32.8
Level 4	34.1	34.4	34.7	35.8	36.4

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $3

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	34.0	34.2	34.7	36.1	36.8
Level 1	34.5	34.8	35.2	36.6	37.3
Level 2	35.4	35.6	36.1	37.4	38.1
Level 3	40.4	40.7	41.0	42.2	42.8
Level 4	43.8	44.0	44.3	45.4	45.9

Modal Shift Trip Reduction Factors

Employer Type:	*Office*
Starting AVR:	*1.21 – 1.50*
Mode Balance:	*Transit*

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $0

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	0.0	0.2	0.7	2.0	2.7
Level 1	0.6	0.7	1.3	2.6	3.2
Level 2	1.5	1.6	2.1	3.5	4.1
Level 3	6.9	*7.0*	*7.5*	*8.7*	*9.4*
Level 4	10.8	10.8	11.3	*12.5*	*13.1*

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $1

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	12.8	13.1	13.6	15.1	15.9
Level 1	13.5	13.8	14.3	15.8	16.6
Level 2	14.5	14.8	15.3	16.8	17.6
Level 3	20.7	21.0	21.4	22.8	23.4
Level 4	25.0	25.2	25.6	26.9	27.5

Modal Shift Trip Reduction Factors

Employer Type:	*Office*
Starting AVR:	*1.21 – 1.50*
Mode Balance:	*Transit*

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $2

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	27.2	27.6	28.1	29.8	30.6
Level 1	28.0	28.3	28.8	30.5	31.3
Level 2	29.0	29.4	29.9	31.5	32.3
Level 3	35.3	35.6	36.0	37.4	38.1
Level 4	39.4	*39.7*	40.1	41.3	41.9

VEHICLE TRIP REDUCTION (Percent)

Financial Incen tive Differential = $3

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	42.1	42.4	42.9	44.5	45.3
Level 1	42.7	43.0	43.5	45.1	45.9
Level 2	43.7	44.0	44.5	46.0	46.8
Level 3	49.1	49.4	49.8	51 .1	51.7
Level 4	52.6	52.9	53.2	54.3	54.9

Modal Shift Trip Reduction Factors

Employer Type:	***Office***
Starting AVR:	***1.51+***
Mode Balance:	***Rideshare***

VEHICLE TRIP REDUCTION
(Percent)

Financial Incentive
Differential = $0

CP & VP PROGRAM SUPPORT	TRANSIT PRQGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	0.0	0.2	0.6	1.7	2.2
Level 1	0.6	0.6	1.2	2.3	2.8
Level 2	1.5	1.6	2.1	3.2	3.7
Level 3	7.0	7.1	7.6	8.6	9.1
Level 4	11.0	11.0	11.5	12.4	12.9

VEHICLE TRIP REDUCTION
(Percent)

Financial Incentive
Differential = $1

CP&VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	11.8	12.0	12.3	13.4	13.9
Level 1	12.3	12.5	12.9	13.9	14.4
Level 2	13.1	13.3	13.6	14.7	15.2
Level 3	17.9	18.1	18.4	19.4	19.9
Level 4	21.4	21.5	21.8	22.7	23.2

Modal Shift Trip Reduction Factors

Employer Type:	*Office*
Starting AVR:	*1.51+*
Mode Balance:	*Rideshare*

VEHICLE TRIP REDUCTION (Percent)	*Financial Incentive Differential = $2*

CP&VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	20.6	20.8	21.1	22.1	22.6
Level 1	21.1	21.2	21.5	22.5	23.0
Level 2	21.7	21.9	22.2	23.2	23.7
Level 3	25.8	26.0	26.3	27.2	27.6
level 4	28.8	28.9	29.2	30.0	30.5

VEHICLE TRIP REDUCTION (Percent)	*Financial Incentive Differential = $3*

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	26.7	26.9	27.2	28.1	28.6
Level 1	27.1	27.2	27.5	28.5	28.9
Level 2	27.6	27.8	28.0	29.0	29.4
Level 3	31.1	31.3	31.6	32.4	32.8
Level 4	33.7	33.9	34.1	34.9	35.3

Modal Shift Trip Reduction Factors

Employer Type:	*Office*
Starting AVR:	*1.51+*
Mode Balance:	*Neutral*

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $0

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	0.0	0.3	0.7	2.1	2.9
Level 1	0.5	0.7	1.2	2.3	3.3
Level 2	1.3	1.4	2.0	3.4	4.1
Level 3	6.0	6.2	6.7	8.0	8.6
Level 4	9.5	9.6	10.1	11.3	12.0

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $1

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	16.0	16.3	16.7	18.1	18.8
Level 1	16.4	16.7	17.1	18.5	19.2
Level 2	17.0	17.3	17.7	19.1	19.7
Level 3	21.2	21.4	21.8	23.0	23.7
Level 4	*24.2*	*24.4*	*24.8*	*25.9*	*26.5*

Modal Shift Trip Reduction Factors

Employer Type:	*Office*
Starting AVR:	*1.51+*
Mode Balance:	*Neutral*

VEHICLE TRIP REDUCTION (Percent)

Financial Incen tive Differential = $2

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	29.1	29.3	29.7	31.0	31.6
Level 1	29.4	29.6	30.0	31.3	31.9
Level 2	29.8	30.1	30.5	31.7	32.3
Level 3	33.1	33.4	33.7	34.8	35.4
Level 4	35.6	35.8	36.1	37.2	37.7

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $3

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	38.8	39.0	39.4	40.5	41.1
Level 1	39.0	39.2	39.6	40.7	41.3
Level 2	39.3	39.5	39.9	41.0	41.6
Level 3	41.8	42.0	42.3	43.3	43.8
Level 4	43.7	43.9	44.1	45.1	45.6

Modal Shift Trip Reduction Factors

Employer Type:	*Office*
Starting AVR:	*1.51+*
Mode Balance:	*Transit*

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $0

CP&VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	0.0	0.4	0.9	2.7	3.6
Level 1	0.4	0.8	1.3	3.1	4.1
Level 2	1.1	1.4	2.0	3.8	4.7
Level 3	5.4	5.7	6.2	7.9	8.7
Level 4	8.6	8.9	9.4	11	11.8

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $1

CP&VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	20.3	20.7	21.2	23.0	23.8
Level 1	20.7	21.0	21.6	23.3	24.2
Level 2	21.2	21.6	22.1	23.8	24.6
Level 3	24.8	25.1	25.6	27.2	28.0
Level 4	27.5	27.8	28.2	29.7	30.4

Modal Shift Trip Reduction Factors

Employer Type:	*Office*
Starting AVR:	*1.51+*
Mode Balance:	*Transit*

VEHICLE TRIP REDUCTION (Percent)

Financial Incen tive Differential = $2

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	38.8	39.1	39.5	41.1	41.9
Level 1	39.0	39.3	39.7	41.3	42.0
Level 2	39.3	39.6	40.0	41.5	42.3
Level 3	41.6	41.9	42.3	43.7	44.4
Level 4	43.5	43.8	44.2	45.4	46.1

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $3

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	54.0	54.2	54.6	55.9	56.6
Level 1	54.0	54.2	54.6	55.9	56.6
Level 2	54.0	54.3	54.6	55.9	56.5
Level 3	55.0	55.2	55.5	56.7	57.3
Level 4	55.9	56.1	56.4	57.5	58.1

Modal Shift Trip Reduction Factors

Employer Type:	*Non–Office*
Starting AVR:	*1.00 – 1.20*
Mode Balance:	*Rideshare*

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $0

CP&VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	0.0	0.2	0.5	1.5	2.0
Level 1	0.3	0.4	0.8	1.8	2.3
Level 2	0.6	0.7	1.1	2.1	2.6
Level 3	*2.8*	*2.9*	*3.3*	*4.2*	*4.7*
Level 4	4.1	*4.2*	*4.6*	*5.6*	*6.0*

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $1

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	5.9	6.1	6.5	7.8	8.5
Level 1	6.3	6.6	6.9	8.2	8.9
Level 2	6.7	7.0	7.4	8.6	9.3
Level 3	9.6	9.8	10.2	11.4	12.0
Level 4	11.3	11.5	11.9	13.1	13.7

Modal Shift Trip Reduction Factors

Employer Type:	*Non-Office*
Starting AVR:	*1.00 – 1.20*
Mode Balance:	*Rideshare*

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $2

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	13.0	13.4	13.8	15.4	16.2
Level 1	13.6	13.9	14.3	15.9	16.7
Level 2	14.1	14.4	14.8	16.4	17.1
Level 3	17.5	17.8	18.2	19.7	20.4
Level 4	19.5	19.8	20.2	21.6	22.3

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $3

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	20.9	21.2	21.7	23.5	24.4
Level 1	21.4	21.8	22.3	24.0	24.9
Level 2	22.0	22.3	22.9	24.6	25.4
Level 3	25.8	26.1	26.6	28.2	28.9
Level 4	28.0	28.3	28.8	30.3	31.0

Modal Shift Trip Reduction Factors

Employer Type:	*Non-Office*
Starting AVR:	*1.00 – 1.20*
Mode Balance:	*Neutral*

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $0

CP&VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	0.0	0.2	0.5	1.6	2.2
Level 1	0.3	0.4	0.8	1.9	2.4
Level 2	0.6	0.7	1.1	2.2	2.7
level 3	2.7	2.8	3.2	4.3	4.8
Level 4	4.0	4.1	4.5	5.5	6.0

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $1

CP&VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	6.0	6.3	6.8	8.2	8.9
Level 1	6.5	6.8	7.2	8.6	9.3
Level 2	6.9	7.2	7.6	9.0	9.7
Level 3	9.7	10.0	10.4	11.8	12.4
Level 4	11.5	11.7	12.1	13.4	14.1

Modal Shift Trip Reduction Factors

Employer Type:	*Non–Office*
Starting AVR:	*1.00 – 1.20*
Mode Balance:	*Neutral*

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $2

CP&VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPQRT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	13.9	14.2	14.8	16.6	17.5
Level 1	14.4	14.7	15.3	17.1	17.9
Level 2	14.9	15.3	15.8	17.6	18.4
Level 3	18.5	18.8	19.3	21.0	21.8
Level 4	20.6	20.9	21.4	23.0	23.8

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $3

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	23.1	23.5	24.1	26.2	27.2
Level 1	23.7	24.1	24.7	26.8	27.8
Level 2	24.3	24.7	25.3	27.3	28.3
Level 3	28.4	28.8	29.3	31.2	32.1
Level 4	30.8	31.1	31.6	33.4	34.2

Modal Shift Trip Reduction Factors

Employer Type:	Non-Office
Starting AVR:	1.00 – 1.20
Mode Balance:	Transit

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $0

CP&VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	0.0	0.2	0.5	1.6	2.2
Level 1	0.3	0.4	0.8	1.9	2.5
Level 2	0.6	0.7	1.1	2.2	2.8
Level 3	2.7	2.8	3.2	4.3	4.8
Level 4	4.0	4.1	4.5	5.6	6.1

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $1

CP&VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	6.1	6.4	6.8	8.3	9.1
Level 1	6.5	6.8	7.3	8.7	9.5
Level 2	6.9	7.2	7.7	9.1	9.9
Level 3	9.8	10.1	10.5	11.9	12.6
Level 4	11.6	11.8	12.2	13.6	14.3

Modal Shift Trip Reduction Factors.

Employer Type:	Non-Office
Starting AVR:	1.00 – 1.20
Mode Balance:	Transit

VEHICLE TRIP REDUCTION (Percent)	***Financial Incentive Differential = $2***

CP&VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	14.1	14.5	15.0	16.9	17.9
Level 1	14.6	15.0	15.6	17.4	18.4
Level 2	15.2	15.6	16.1	18.0	18.9
Level 3	18.9	19.2	19.7	21.4	22.3
Level 4	21 .0	21.4	21.9	23.5	24.3

VEHICLE TRIP REDUCTION (Percent)	***Financial Incentive Differential = $3***

CP&VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	23.8	24.3	24.9	27.1	28.2
Level 1	24.4	24.9	25.6	27.7	28.8
Level 2	25.1	25.5	26.2	28.3	29.3
Level 3	29.3	29.7	30.3	32.2	33.2
Level 4	31.8	32.1	32.7	34.5	35.4

Modal Shift Trip Reduction Factors

Employer Type:	*Non–Office*
Starting AVR:	*1.21 – 1.50*
Mode Balance:	*Rideshare*

VEHICLE TRIP REDUCTION (Percent)	*Financial Incentive Differential = $0*				
CP&VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	0.0	0.2	0.5	1.6	2.1
Level 1	0.3	0.4	0.8	1.9	2.4
Level 2	0.6	0.7	1.2	2.2	2.7
Level 3	2.9	3.0	3.4	4.4	4.9
Level 4	4.2	4.3	4.7	5.7	6.2

VEHICLE TRIP REDUCTION (Percent)	*Financial Incentive Differential = $1*				
CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	10.5	10.7	11.1	12.3	12.9
Level 1	10.9	11.1	11.5	12.6	13.2
Level 2	11.2	11.5	11.8	13.0	13.5
Level 3	13.7	13.9	14.2	15.4	15.9
Level 4	15.2	15.4	15.7	16.8	17.3

Modal Shift Trip Reduction Factors

Employer Type:	*Non–Office*
Starting AVR:	*1.21 – 1.50*
Mode Balance:	*Rideshare*

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $2

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	20.8	21.0	21.4	22.6	23.2
Level 1	21.1	21.4	21.7	22.9	23.5
Level 2	21.5	21.7	22.1	23.3	23.9
Level 3	24.0	24.2	24.5	25.7	26.2
Level 4	25.5	25.7	26.0	27.1	27.7

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $3

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	29.6	29.9	30.2	31.4	32.0
Level 1	30.0	30.2	30.6	31.8	32.3
Level 2	30.3	30.5	30.9	32.1	32.7
Level 3	32.7	32.9	33.2	34.7	34.9
Level 4	34.1	34.3	34.6	35.7	36.2

Modal Shift Trip Reduction Factors

Employer Type:	*Non- Office*
Starting NW:	*1.26 – 1.50*
Mode Balance:	*Neutral*

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $0

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	0.0	0.2	0.6	1.8	2.4
Level 1	0.3	0.4	0.9	2.1	2.7
Level 2	0.6	0.7	1.2	2.3	2.9
Level 3	2.6	2.7	3.2	4.3	4.9
Level 4	3.8	4.0	4.4	5.5	6.1

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $1

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	11.4	11.6	12.1	13.4	14.1
Level 1	11.7	12.0	12.4	13.7	14.4
Level 2	12.0	12.3	12.7	14.0	14.7
Level 3	14.3	14.6	14.9	16.2	16.9
Level 4	15.7	15.9	16.3	17.6	18.2

Modal Shift Trip Reduction Factors

Employer Type:	*Non–Office*
Starting AVR:	*1.21 – 1.50*
Mode Balance:	*Neutral*

VEHICLE TRIP REDUCTION
(Percent)

Financial Incentive Differential = $2

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	23.1	23.4	23.9	25.3	26.0
Level 1	23.4	23.7	24.2	25.6	26.3
Level 2	23.8	24.0	24.5	25.9	26.3
Level 3	26.1	26.4	26.8	28.1	28.8
Level 4	27.5	27.8	28.2	29.5	30.1

VEHICLE TRIP REDUCTION
(Percent)

Financial Incentive Differential = $3

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	34.0	34.2	34.7	36.1	36.8
Level 1	34.2	34.5	35.0	36.4	37.1
Level 2	34.5	34.8	35.2	36.6	37.3
Level 3	36.7	37.0	37.4	38.7	39.4
Level 4	38.0	38.3	38.7	39.9	40.6

Modal Shift Trip Reduction Factors

Employer Type:	*Non–Office*
Starting AVR:	*1.21 – 1.50*
Mode Balance:	*Transit*

VEHICLE TRIP REDUCTION
(Percent)

Financial Incentive Differential = $0

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	0.0	0.2	0.7	2.0	2.7
Level 1	0.3	0.5	1.0	2.3	3.0
Level 2	0.6	0.8	1.3	2.6	3.2
Level 3	2.7	2.8	3.3	4.6	5.3
Level 4	4.0	4.1	4.6	5.9	6.5

VEHICLE TRIP REDUCTION
(Percent)

Financial Incentive Differential = $1

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	12.8	13.1	13.6	15.1	15.9
Level 1	13.1	13.4	13.9	15.5	16.2
Level 2	13.5	13.8	14.3	15.8	16.6
Level 3	15.9	16.2	16.7	18.2	18.9
Level 4	17.4	17.7	18.2	19.6	20.3

Modal Shift Trip Reduction Factors

Employer Type:	*Non-Office*
Starting AVR:	*1.21 – 1.50*
Mode Balance:	*Transit*

VEHICLE TRIP REDUCTION
(Percent)

Financial Incentive
Differential = $2

CP&VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	27.2	27.6	28.1	29.8	30.6
Level 1	27.6	27.9	28.4	30.1	30.9
Level 2	28.0	28.3	28.8	30.5	31.3
Level 3	30.6	30.9	31.3	32.9	33.7
Level 4	32.1	32.4	32.9	34.4	35.1

VEHICLE TRIP REDUCTION
(Percent)

Financial Incentive
Differential = $3

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	42.1	42.4	42.9	44.5	45.3
Level 1	42.4	42.7	43.2	44.8	45.6
Level 2	42.7	43.0	43.5	45.1	45.9
Level 3	45.1	45.4	45.9	47.3	48.1
Level 4	46.5	46.8	47.2	48.6	49.3

Modal Shift Trip Reduction Factors

Employer Type:	*Non-Office*
Starting AVR:	*1.51+*
Mode Balance:	*Rideshare*

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $0

CP&VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	0.0	0.2	0.6	1.7	2.2
Level 1	0.3	0.4	0.9	2.0	2.5
Level 2	0.6	0.7	1.2	2.3	2.6
Level 3	2.8	2.9	3.3	4.4	4.9
Level 4	4.1	4.2	4.6	5.7	6.2

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $1

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	11.8	12.0	12.3	13.4	13.9
Level 1	12.1	12.3	12.6	13.7	14.2
Level 2	12.3	12.5	12.9	13.9	14.4
Level 3	14.3	14.5	14.8	15.8	16.3
Level 4	15.4	15.6	16.0	17.0	17.5

Modal Shift Trip Reduction Factors

Employer Type:	*Non–Office*
Starting AVR:	*1.51+*
Mode Balance:	*Rideshare*

VEHICLE TRIP REDUCTION (Percent)	*Financial Incentive Differential = $2*

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	20.6	20.8	21.1	22.1	22.6
Level 1	20.8	21.0	21.3	22.3	22.8
Level 2	21.1	21.2	21.5	22.5	23.0
Level 3	22.7	22.9	23.2	24.2	24.7
Level 4	23.6	24.0	24.3	25.2	25.7

VEHICLE TRIP REDUCTION (Percent)	*Financial Incen tive Differential = $3*

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	26.7	26.9	27.2	28.1	28.6
Level 1	26.9	27.1	27.3	28.3	28.7
Level 2	27.1	27.2	27.5	28.5	28.9
Level 3	26.6	26.7	29.0	29.9	30.4
Level 4	29.5	29.7	29.9	30.6	31.2

Modal Shift Trip Reduction Factors

Employer Type:	*Non–Office*
Starting AVR:	*1.51+*
Mode Balance:	*Neutral*

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $0

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	0.0	0.3	0.7	21	2.9
Level 1	0.3	0.5	1.0	2.4	3.1
Level 2	0.5	0.7	1.2	2.6	3.3
Level 3	2.4	2.6	3.1	4.4	5.1
Level 4	3.5	3.8	4.2	5.6	6.2

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $1

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	16.0	16.3	16.7	18.1	18.8
Level 1	16.2	16.5	16.9	18.3	19.0
Level 2	16.4	16.7	17.1	18.5	19.2
Level 3	18.1	18.4	18.8	20.1	20.7
Level 4	19.1	19.4	19.8	21.1	21.7

Modal Shift Trip Reduction Factors

Employer Type:	*Non–Office*
Starting AVR:	*1.51+*
Mode Balance:	*Neutral*

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $2

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	29.1	29.3	29.7	31.0	31.6
Level 1	29.2	29.5	29.9	31.1	31.8
Level 2	29.4	29.6	30.0	31.3	31.9
Level 3	30.8	31.0	31.4	32.6	33.2
Level 4	31.6	31.9	32.2	33.4	34.0

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $3

CP&VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	38.8	39.0	39.4	40.5	41.1
Level 1	38.9	39.1	39.5	40.6	41.2
Level 2	39.0	39.2	39.6	40.7	41.3
Level 3	40.1	40.3	40.6	41.7	42.3
Level 4	40.8	41.0	41.3	42.4	42.9

Modal Shift Trip Reduction Factors

Employer Type:	*Non-Bf#ke*
Starting AVR:	*1.51+*
Mode Balance:	***Transit***

VEHICLE TRIP REDUCTION (Percent)	*Financial Incentive Differential = $0*

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	0.0	0.4	0.9	2.7	3.6
Level 1	0.2	0.6	1.1	2.9	3.8
Level 2	0.4	0.8	1.3	3.1	4.1
Level 3	2.1	2.5	3.0	4.8	5.7
Level 4	3.2	3.5	4.1	5.8	6.7

VEHICLE TRIP REDUCTION (Percent)	*Financial Incentive Differential = $1*

CP & VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	20.3	20.7	21.2	23.0	23.8
Level 1	20.5	20.9	21.4	23.1	24.0
Level 2	20.7	21.0	21.6	23.3	24.2
Level 3	22.2	22.5	23.0	24.7	25.5
Level 4	23.1	23.4	23.9	25.6	26.4

Modal Shift Trip Reduction Factors

Employer Type:	*Non–Office*
Starting AVR:	*1.51+*
Mode Balance:	*Transit*

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $2

CP&VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	38.8	39.1	39.5	41.1	41.9
Level 1	38.9	39.2	39.6	41.2	42.0
Level 2	39.0	39.3	39.7	41.3	42.0
Level 3	40.0	40.3	40.8	42.3	43.0
Level 4	40.7	41.0	41.4	42.9	43.6

VEHICLE TRIP REDUCTION (Percent)

Financial Incentive Differential = $3

CP&VP PROGRAM SUPPORT	TRANSIT PROGRAM SUPPORT				
	Level 0	Level 1	Level 2	Level 3	Level 4
Level 0	54.0	54.2	54.6	55.9	56.6
Level 1	54.0	54.2	54.6	55.9	56.6
Level 2	54.0	54.2	54.6	55.9	56.6
Level 3	54.5	54.8	55.1	56.4	57.0
Level 4	54.9	55.1	55.5	56.7	57.3

APPENDIX B

BLANK WORKSHEETS

WORKSHEET 1
Calculation of Average Vehicle Ridership (AVR)

	Total Employees Traveling to Site, by Mode		Total Vehicle Trips to Site
Drive Alone/Driven & Dropped Off		Divide by 1	
Motorcycle		Divide by 1	
Carpool, 2 Person		Divide by 2	
Carpool, 3 Person		Divide by 3	
Carpool, 4+ Person		Divide by 4 *(or count of # of vehicles)*	
Total Carpool	*	Divide by 2.5	
Vanpool		Divide by # of Vans *(or 12 if not known)*	
Buspool		Divide by # of Buses *(or 30 if not known)*	
Public Transit			None
Bicycle			None
Walk			None
Total Persons P =		**Total Vehicles V =**	

Average Vehicle Ridership (AVR):

$$AVR = \frac{P}{V} = \frac{\quad}{\quad} = \quad$$

** Use this space to estimate carpool vehicle trips if an exact count by 2, 3, 4+ occupancy group is not available.*

WORKSHEET 2
Determination of Modal Bias

From Worksheet 1:

Total Percent of Employees Traveling to Site who use Alternative Modes (AM)
(All Methods except Drive Alone & Motorcycle)
AM _____ **%**

Total Percent of Employees Using Public Transit (TR)
TR _____ **%**

Total Percent of Employees Using Rideshare Modes (RS)
(Carpool, Vanpool, Buspool)
RS _____ %

Calculate:

TR _____ **%**
AM _____ **%**
_____ **%**

RS _____ **%**
AM _____ **%**
_____ **%**

If > 50%, Site is "Transit Favorable"
TR ■

If Neither is > 50%, Site is "Mode Neutral"
MN ■

If > 50%, Site is "Rideshare Favorable"
RS ❑

WORKSHEET 3
Calculation **of Peak** Vehicle Trips (Optional)

From Worksheet 1:

Total Persons Traveling to Site **(P)** **P** _____

Total Daily One-way Vehicle Trips (V) **V** _____

Definition of Peak Condition:

☐ Peak Hour (7:30 - 8:30 AM or _____)

Peak Period (6:00- 10:00 AM or _____)
Just check box, nothing to enter

Number of Employees Traveling to
Site During Defined Peak Hour/Period **(PK)** **PK**

Percent Arriving in Peak:

PK%= $\frac{\textbf{PK}}{\textbf{P}}$ = _____ = _____ %

Peak Vehicle Trips

PVT= PK%xV _____ _____ _____

WORKSHEET 4
Establish Trip Reduction Targets

AVR Goal:

$$\frac{\frac{1}{AVR_p} - \frac{1}{AVR_t}}{\frac{1}{AVR_p}} = \frac{\frac{1}{\square} - \frac{1}{\square}}{\frac{1}{\square}} = \square\,\% \quad \textit{Desired Trip Reduction}$$

Daily Trip Reduction Goal:

$$\frac{V_p - V_t}{V_p} = \frac{\square - \square}{\square} = \square\,\% \quad \textit{Desired Trip Reduction}$$

Peak Period Trip Reduction Goal:

$$\frac{PV_p - PV_t}{PV_p} = \frac{\square - \square}{\square} = \square\,\% \quad \textit{Desired Trip Reduction}$$

Note: p = present condition
t = target condition

WORKSHEET 5
TDM Impact Worksheet

Target Trip Reduction: _____ %

Trial #: _____

Starting Conditions:

AVR1	VT1	PVT1
Average Vehicle Ridership	*Total Vehicle Trips*	*Peak Vehicle Trips*

Modal Shift strategies:

Ride Share Level: ____

Transit Level: ____

Pricing Differential: ____

VTRm ____ *Vehicle Trip Reduction*

$$AVR2 = \frac{AVR}{(1 - VTRm)}$$

VT2 = VT1 x (1 - VRTm) = _____

PVT2 = PVT1 x (1 - VRTm) = _____

Alternate Work Arrangements

Compressed Work Weeks:

Pct 3/36 _____ x0.4=

Pct 4/40 _____ x0.2=

Pct 9/80 _____ x0.1 =

Telecommute:

Pct 1 day _____ x 0.2 =

Pct2 days _____ x0.4=

Pct 3 days _____ x0.6=

Pct 4 days _____ x 0.8 =

Pct 5 days _____ x1.0=

Total Pct A.W.A. _____ **VTRa**

$$AVR3 = \frac{AVR2}{(1 - VTRa)} =$$

VT3 = VT2 x (1 - VRTa) =

PVT3 = PVT2 x (1 - VRTa) = _____

Time Shift Actions:

Flex-Time/Staggered Hours:

Pct Employees Moved Outside Defined Peak ____

Compressed Work Week:

Pct 3/36 _____ x.60=

Pct 4/40 _____ x.40=

Pct 9/80 _____ x.10=

VTRs ____

AVR4 = No Change =

VT4= No Change =

PVT4 = PVT3 x (1- VRTs) = _____

WORKSHEET 5
TDM Impact Worksheet

Target Trip Reduction: _____ %

Trial #: _____

Starting Conditions:

AVR1	VT1	PVT1
Average Vehicle Ridership	*Total Vehicle Trips*	*Peak Vehicle Trips*

Modal Shift Strategies:

Ride Share Level: ____
Transit Level: ____
Pricing Differential: ____

VTRm ____ *Vehicle Trip Reduction*

$$AVR2 = \frac{AVR}{(1 - VTRm)} = \_\_\_\_$$

$$VT2 = VT1 \times (1 - VRTm) = \_\_\_\_$$

$$PVT2 = PVT1 \times (1 - VRTm) = \_\_\_\_$$

Alternate Work Arrangements:

Compressed Work Weeks:

Pct 3/36		x 0.4 =	
Pct 4/40		x 0.2 =	
Pct 9/80		x 0.1 =	

Telecommute:

Pct 1 day		x 0.2 =	
Pct 2 days		x 0.4 =	
Pct 3 days		x 0.6 =	
Pct 4 days		x 0.8 =	
Pct 5 days		x 1.0 =	
Total Pct A.W.A.		VTRa	

$$AVR3 = \frac{AVR2}{(1 - VTRa)} = \_\_\_\_$$

$$VT3 = VT2 \times (1 - VRTa) = \_\_\_\_$$

$$PVT3 = PVT2 \times (1 - VRTa) = \_\_\_\_$$

Time Shift Actions:

Flex-Time/Staggered Hours:

Pct Employees Moved Outside Defined Peak: ____

Compressed Work Week:

Pct 3/36		x .60 =	
Pct 4/40		x .40 =	
Pct 9/80		x .10 =	
		VTRs	

$$AVR4 = \text{No Change} = \_\_\_\_$$

$$VT4 = \text{No Change} = \_\_\_\_$$

$$PVT4 = PVT3 \times (1 - VRTs) = \_\_\_\_$$

WORKSHEET 5
TDM Impact Worksheet

Target Trip Reduction: _____ %

Trial #: _____

Starting Conditions:

AVR1	VT1	PVT1
Average Vehicle Ridership	*Total Vehicle Trips*	*Peak Vehicle Trips*

Modal Shift Strategies:

Ride Share Level: ____
Transit Level: ____
Pricing Differential: ____

VTRm ____ *Vehicle Trip Reduction*

$$AVR2 = \frac{AVR}{(1 - VTRm)} = \_\_\_\_$$

$$VT2 = VT1 \times (1 - VRTm) = \_\_\_\_$$

$$PVT2 = PVT1 \times (1 - VRTm) = \_\_\_\_$$

Alternate Work Arrangements:

Compressed Work Weeks:

Pct 3/36		x 0.4 =	
Pct 4/40		x 0.2 =	
Pct 9/80		x 0.1 =	

Telecommute:

Pct 1 day		x 0.2 =	
Pct 2 days		x 0.4 =	
Pct 3 days		x 0.6 =	
Pct 4 days		x 0.8 =	
Pct 5 days		x 1.0 =	
Total Pct A.W.A.		VTRa	

$$AVR3 = \frac{AVR2}{(1 - VTRa)} = \_\_\_\_$$

$$VT3 = VT2 \times (1 - VRTa) = \_\_\_\_$$

$$PVT3 = PVT2 \times (1 - VRTa) = \_\_\_\_$$

Time Shift Actions:

Flex-Time/Staggered Hours:

Pct Employees Moved Outside Defined Peak ____

Compressed Work Week:

Pct 3/36		x .60 =	
Pct 4/40		x .40 =	
Pct 9/80		x .10 =	
		VTRs	

$$AVR4 = \text{No Change} = \_\_\_\_$$

$$VT4 = \text{No Change} = \_\_\_\_$$

$$PVT4 = PVT3 \times (1 - VRTs) = \_\_\_\_$$

WORKSHEET 5
TDM Impact Worksheet

Target Trip Reduction: _____ %

Trial #: _____

Starting Conditions:

AVR1	VT1	PVT1
Average Vehicle Ridership	*Total Vehicle Trips*	*Peak Vehicle Trips*

Modal Shift Strategies:

Ride Share Level: ____
Transit Level: ____
Pricing Differential: ____

VTRm ____ *Vehicle Trip Reduction*

$$AVR2 = \frac{AVR}{(1 - VTRm)} = \_\_\_\_$$

VT2 = VT1 x (1 - VRTm) = ____

PVT2 = PVT1 x (1 - VRTm) = ____

Alternate Work Arrangements:

Compressed Work Weeks:

Pct 3/36		x 0.4 =	
Pct 4/40		x 0.2 =	
Pct 9/80		x 0.1 =	

Telecommute:

Pct 1 day		x 0.2 =	
Pct 2 days		x 0.4 =	
Pct 3 days		x 0.6 =	
Pct 4 days		x 0.8 =	
Pct 5 days		x 1.0 =	
Total Pct A.W.A.		VTRa	

$$AVR3 = \frac{AVR2}{(1 - VTRa)} = \_\_\_\_$$

VT3 = VT2 x (1 - VRTa) = ____

PVT3 = PVT2 x (1 - VRTa) = ____

Time Shift Actions:

Flex-Time/Staggered Hours:

Pct Employees Moved Outside Defined Peak: ____

Compressed Work Week:

Pct 3/36		x .60 =	
Pct 4/40		x .40 =	
Pct 9/80		x .10 =	
		VTRs	

AVR4 = No Change = ____

VT4 = No Change = ____

PVT4 = PVT3 x (1 - VRTs) = ____

WORKSHEET 6
TDM Program Test Summary Table

Trial	Mode Shift Actions	Alternate Work Arrange-ments	Time Shift Actions	AVR	VT	PVT
Starting Conditions						
1	☐✓	☐✓	☐✓			
			Percent Change →			
2	☐✓	☐✓	☐✓			
			Percent Change →			
3	☐✓	☐✓	☐✓			
			Percent Change →			
4	☐✓	☐✓	☐✓			
			Percent Change →			
5	☐✓	☐✓	☐✓			
			Percent Change →			
6	☐✓	☐✓	☐✓			
			Percent Change →			
7	☐✓	☐✓	☐✓			
			Percent Change →			
8	☐✓	☐✓	☐✓			
			Percent Change →			
9	☐✓	☐✓	☐✓			
			Percent Change →			
10	☐✓	☐✓	☐✓			
			Percent Change →			

*U.S G.P.O.:1994-301-717:80476

NOTICE

This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

The United States Government does not endorse manufacturers or products. Trade names appear in the document only because they are essential to the content of the report.

This report is being distributed through the U.S. Department of Transportation's Technology Sharing Program.

DOT-T-94-05

DOT-T-94-05

TECHNOLOGY SHARING

A Program of the U.S. Department of Transportation