RITA Intelligent Transportation Systems Joint Program Office

# San Francisco
# Urban Partnership Agreement

## National Evaluation:
## Telecommuting/TDM Data Test Plan

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U.S. Department of Transportation
Research and Innovative Technology Administration

# SAN FRANCISCO
# URBAN PARTNERSHIP AGREEMENT

# NATIONAL EVALUATION:
# TELECOMMUTING/TDM
# DATA TEST PLAN

By

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Prepared for

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16. Abstract

This report presents the test plan for collecting and analyzing telecommuting/TDM data for the San Francisco Urban Partnership Agreement (UPA) under the United States Department of Transportation (U.S. DOT) UPA Program. The San Francisco UPA projects focus on reducing congestion by employing strategies consisting of combinations of tolling, transit, telecommuting/travel demand management (TDM), and technology, also known as the 4 Ts. The national evaluation focuses on the San Francisco UPA projects that deal with parking pricing in downtown San Francisco and supporting technology and telecommuting/TDM projects. The SF*park* parking pricing pilot will implement variable pricing in on-street and garage parking in selected parking districts. Information on parking availability and price will be available by phone, websites, and variable message signs. Outreach events for alternate commute programs will inform the public about the parking pricing and information projects. The Telecommuting/TDM Data Test Plan is based on the San Francisco UPA National Evaluation Plan. This test plan describes the telecommuting/TDM data sources, data availability, and possible risks associated with the data. The methods for analyzing the telecommuting/TDM data are discussed. The schedule and responsibilities for collecting, analyzing, and reporting the telecommuting/TDM analysis are presented.

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| | |
|---|---|
| 4Ts | Tolling, transit, telecommuting/travel demand management, and technology |
| CVO | Commercial vehicle operator |
| DOE | Department of the Environment |
| ERH | Emergency ride home |
| FHWA | Federal Highway Administration |
| ISP | Information service provider |
| ITS | Intelligent transportation systems |
| MTC | Metropolitan Transportation Commission |
| SFCTA | San Francisco County Transportation Authority |
| SFMTA | San Francisco Municipal Transportation Agency |
| TDM | Travel demand management |
| UPA | Urban Partnership Agreement |
| U.S. DOT | United States Department of Transportation |
| VT | Vehicle trips |

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# 1.0 INTRODUCTION

This report presents the test plan for collecting and analyzing telecommuting/travel demand management (TDM) data for the national evaluation of the San Francisco Urban Partnership Agreement (UPA) under the United States Department of Transportation (U.S. DOT) UPA program. The San Francisco UPA is one of several large field deployments around the United States that are receiving U.S. DOT funding and which are intended to demonstrate congestion pricing and supporting strategies. The San Francisco UPA national evaluation will address the four primary U.S. DOT UPA evaluation questions shown in Table 1-1.

**Table 1-1. U.S. DOT National Evaluation "Objective Questions"**

| | |
|---|---|
| **Objective Question #1** | How much was congestion reduced in the area impacted by the implementation of the tolling, transit, technology, and telecommuting strategies? It is anticipated that congestion reduction could be measured by one of the following measures, and will vary by site and implementation strategy:<br>• reductions in vehicle trips made during peak/congested periods;<br>• reductions in travel times during peak/congested periods;<br>• reductions in congestion delay during peak/congested periods; and<br>• reductions in the duration of congested periods. |
| **Objective Question #2** | What are the associated impacts of implementing the congestion reduction strategies? It is anticipated that impacts will vary by site and that the following measures may be used:<br>• increases in facility throughput during peak/congested periods;<br>• increases in transit ridership during peak/congested periods;<br>• modal shifts to transit and carpools/vanpools;<br>• traveler behavior change (e.g., shifts in time of travel, mode, route, destination, or forgoing trips);<br>• operational impacts on parallel systems/routes;<br>• equity impacts;<br>• environmental impacts;<br>• impacts on goods movement; and<br>• effects on businesses. |
| **Objective Question #3** | What are the non-technical success factors with respect to the impacts of outreach, political and community support, and institutional arrangements implemented to manage and guide the implementation? |
| **Objective Question #4** | What are the overall costs and benefits of the deployed set of strategies? |

The questions shown in Table 1-1 will be addressed by carrying out the following ten "evaluation analyses" described in the San Francisco UPA National Evaluation Plan: congestion, pricing, telecommuting/TDM, technology, equity, environmental, goods movement, business impacts, non-technical success factors, and cost-benefit. Each of these ten analyses relies upon various evaluation measures of effectiveness.

"Test plans" are the evaluation planning documents that describe how specific data will be collected and processed to yield the evaluation measures of effectiveness required for the various analyses. Whereas evaluation analyses are categorized according to related evaluation questions

or types of impacts, for example all equity-related impacts are addressed in the equity analysis, test plans are categorized according to common data types or sources. For example, the Traffic System Data Test Plan collects and processes all of the traffic data required for the national evaluation. In addition to this Telecommuting/TDM Data Test Plan, the other nine test plans focus on the following types of data: traffic, parking, transit, traveler information, surveys and interviews, environmental, content analysis, cost benefit analysis, and exogenous factors.

The relationship between test plans and evaluation analyses is discussed in Section 1.2. In short, analyses describe the evaluation questions and hypotheses to be investigated and the test plans describe how the data and measures of effectiveness needed to support the evaluation will be collected and processed. Most test plans collect data and provide measures of effectiveness that will be used in multiple analyses and most analyses rely upon data and measures developed through several different test plans.

The remainder of this introduction chapter identifies the San Francisco UPA deployments and elaborates on the relationship between test plans and evaluation analyses. The remainder of the report is divided into three sections. Chapter 2.0 presents the data sources, data availability, and risks associated with the telecommuting/TDM data collected through this test plan. Chapter 3.0 discusses how all of the telecommuting/TDM data will be analyzed and used in the national evaluation. Chapter 4.0 presents the schedule and responsibilities for collecting and analyzing the telecommuting/TDM data.

## 1.1 The San Francisco UPA

San Francisco was selected by the U.S. DOT as an Urban Partner to implement projects aimed at reducing congestion based on four complementary strategies known as the 4Ts: tolling, transit, telecommuting/TDM, and technology. Under contract to the U.S. DOT, a national evaluation team led by Battelle is assessing the impacts of the projects in a comprehensive and systematic manner in San Francisco and other sites. The national evaluation will generate information and produce technology transfer materials to support deployment of the strategies in other metropolitan areas. The national evaluation will also generate findings for use in future Federal policy and program development related to mobility, congestion, and facility pricing.

The San Francisco local UPA partners for the national evaluation consist of three public agencies. Two of the partners represent the City of San Francisco--the San Francisco County Transportation Authority (SFCTA) and the San Francisco Municipal Transportation Agency (SFMTA). The third partner is the Metropolitan Transportation Commission (MTC), the metropolitan planning organization for the Bay Area.

The San Francisco projects are focused on reducing traffic congestion related to parking in downtown San Francisco. Intelligent transportation systems (ITS) technologies underlie many of the San Francisco UPA projects, including those utilizing parking sensors and real-time parking

information. The San Francisco UPA projects that will be evaluated[1] are described briefly below.

**SF*park* Variable Pricing.** SF*park* is the name given to the parking pricing system to be implemented by SFMTA. The primary goal of SF*park* is to use intelligent parking management technology and techniques, in particular demand-responsive pricing, to manage the on-street and off-street parking supply and demand. SFMTA expects this approach to increase parking availability, reduce the number and duration of vehicle trips (VT) and reduce double parking and, thereby, reduce congestion. The parking technologies to be tested include networked parking meters, parking occupancy sensors, and parking information systems. Pricing policies may change over the course of the evaluation period, as SF*park* managers adjust rates in response to demand. Some extensions in times of day/week that meters are operable are also possible pending SFMTA Board actions.

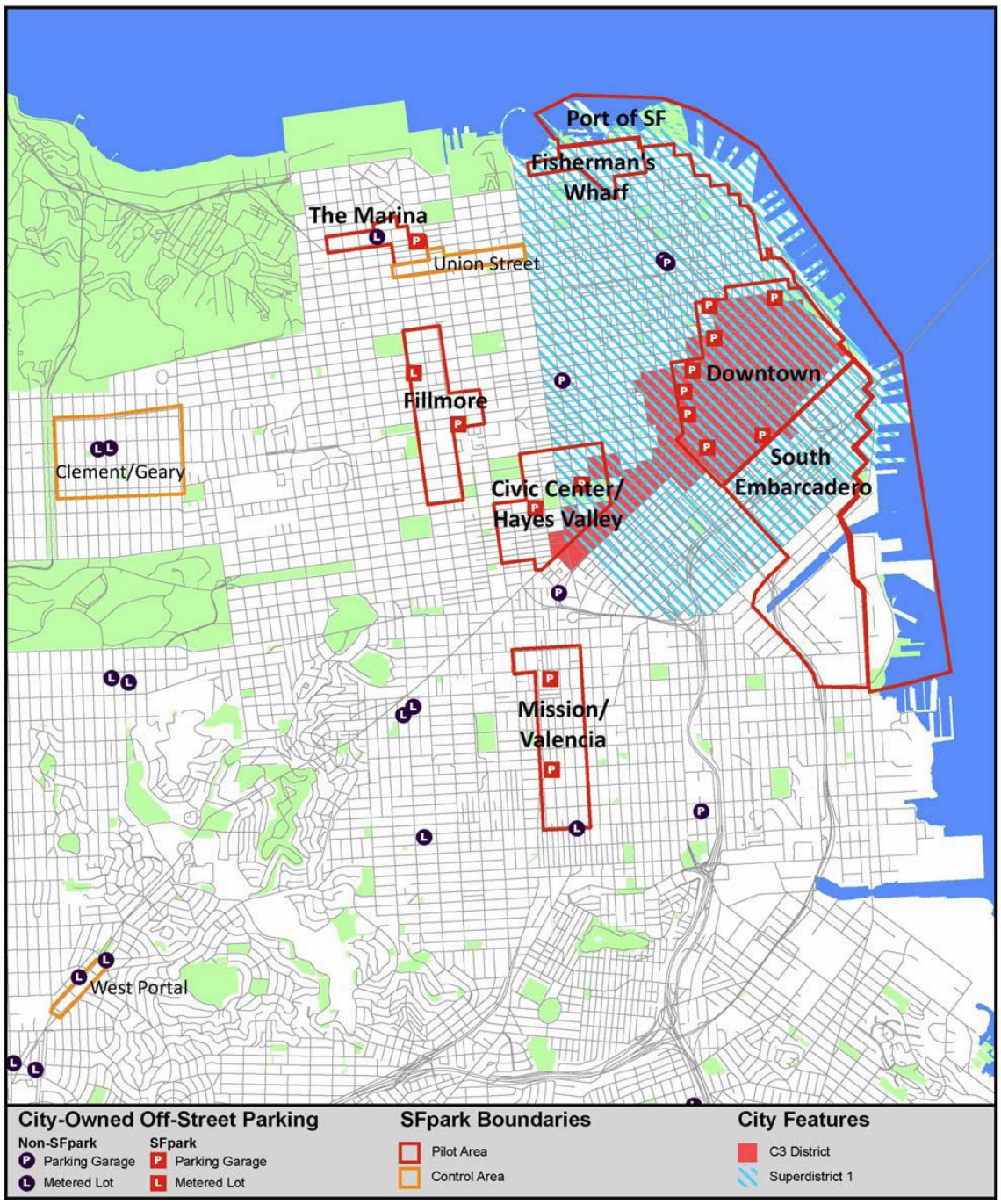
The pilot areas for SF*park* are highlighted in red (or dark lines) in Figure 1-1. The new system will consist of approximately 6,000 metered on-street parking spaces (about one-quarter of the city's total supply) and 12,250 parking spaces in fourteen city-operated garages and one lot. Control areas, highlighted in yellow (or light lines) in Figure 1-1, will be equipped with traffic sensors for monitoring use of the parking supply where variable pricing is not implemented.

To assist travelers in making choices about parking pre-trip and en-route, SFMTA will disseminate parking information in various ways. Strategically placed variable message signs[2] will show parking availability in city-operated garages, and parking availability and pricing information will also be displayed on SFMTA's website and by text messaging to mobile devices.

**511 Upgrades.** The 511 phone and website in the San Francisco Bay Area, operated by MTC, is one of the most advanced in the country, including a variety of multi-modal information. However, at the present time, the parking information on 511 is limited to static information about park and ride lots and rail stations (on the web) and airport parking (on the phone). The planned upgrades will provide parking space availability and pricing information for selected parking facilities in downtown San Francisco by 511 phone and web and by information service providers (ISPs) in the region who receive a feed of 511 data from MTC. MTC will receive a real-time data feed of parking availability for parking garages managed by SFMTA and pricing data for those SFMTA garages, lots, and on-street parking. The user interfaces on 511 phone and website will be enhanced to disseminate the parking information to 511 customers.

[1] The Clipper[SM] electronic payment card (formerly known as TransLink®) that was to be piloted for parking payment at five SFMTA garages was removed from the national evaluation owing to uncertainty about when it would be deployed.

[2] The deployment of the variable message signs has been delayed to December 2011, placing them several months behind the other UPA projects. Rather than delay evaluation of the rest of the projects, the decision was made not to include them in the national evaluation.




San Francisco Municipal Transportation Agency, used with permission.

**Figure 1-1. SF*park* Pilot and Control Zones**

**Expansion of San Francisco Telecommuting and Alternate Commute Programs.** Under the direction of the SFCTA, the telecommuting and alternate commute programs will be undertaken by the City of San Francisco's Department of the Environment (DOE). In support of the SF*park* and 511 enhancements, DOE and SFCTA plans include two activities: promotion of SF*park* at DOE outreach events and promotion of 511 enhancements at outreach events. Through the outreach efforts, downtown workers will be better informed about the UPA initiatives and can better use the parking and information resources available to them.

**Schedule for the San Francisco UPA Projects.** The projects to be evaluated will go into operation between in mid-2011 and late 2011. SFMTA will be implementing variable pricing in SF*park* zones in mid-2011. Also in mid-2011, real-time parking information will become available via SFMTA's website and text messaging and the MTC 511 phone system. In late 2011 parking information will be available on the 511 website. As the SFMTA and MTC projects are deployed, SFCTA will conduct its expanded outreach and alternate commute program.

## 1.2 San Francisco UPA National Evaluation Plan and the Use of TDM Data

Table 1-2 shows which of the various San Francisco UPA test plans will contribute data to each of the evaluation analyses. The "flow" between test plans is "one way" in the sense that test plans feed data and measures to the analyses rather than the reverse. The solid circles show where data from a given test plan constitutes a major input to an analysis; the open circles show where data from a given test plan constitutes a supporting input to an analysis. Data from the Telecommuting/TDM Data Test Plan will be used for telecommuting/TDM analysis. Table 1-3 presents the telecommuting/TDM data elements and the measures of effectiveness and the hypotheses/questions the telecommuting/TDM data will be used to evaluate.

**Table 1-2. Relationship among Test Plans and Evaluation Analysis**

| San Francisco UPA Test Plans | Congestion Analysis | Pricing Analysis | Telecommuting/ TDM Analysis | Technology Analysis | Equity Analysis | Environmental Analysis | Goods Movement Analysis | Business Impact Analysis | Non-Technical Success Factors Analysis | Cost Benefit Analysis |
|---|---|---|---|---|---|---|---|---|---|---|
| Traffic System Data Test Plan | ● | | | | ○ | | ○ | | | ○ |
| Parking Data Test Plan | | ● | | ○ | ○ | ○ | ● | ○ | | |
| Transit System Data Test Plan | ○ | ● | | | | ○ | | | | ○ |
| Telecommuting/TDM Data Test Plan | | | ● | | | | | | | |
| Traveler Information Data Test Plan | | | | ● | | | | | | |
| Surveys and Interviews Test Plan | ● | ● | ● | ● | ● | ○ | | ○ | ● | ○ |
| Environmental Data Test Plan | | | | | ○ | ● | | | | ○ |
| Content Analysis Test Plan | | | | | | | | | ● | |
| Cost Benefit Analysis Test Plan | | | | | | | | | | ● |
| Exogenous Factors Test Plan | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

● — Major Input ○ — Supporting Input

**Table 1-3. Telecommuting/TDM Data Test Plan Data Elements Use in Testing Evaluation Hypotheses/Questions**

| San Francisco TDM Data Element | San Francisco UPA Measure of Effectiveness | San Francisco UPA Hypotheses/Questions* |
|---|---|---|
| 1. Number of outreach events | • Total and average number of brochures on SF*park* and 511 distributed at events | SFTele/TDM-1 |
| 2. Number of brochures distributed | • Total and average number of brochures on SF*park* and 511 distributed at events | SFTele/TDM-1 |
| 3. Rideshare matches requested | • Changes in enrollment rates | SFTele/TDM-2 |
| 4. New employer enrollments in ridematching | • Changes in enrollment rates | SFTele/TDM-2 |
| 5. New employer and employee pre-tax enrollment | • Changes in enrollment rates | SFTele/TDM-2 |
| 6. Employer and employee enrollment for guaranteed ride home program | • Changes in enrollment rates | SFTele/TDM-2 |

*Listed are acronyms corresponding to hypotheses/questions to be addressed with data from this test plan. An explanation of these acronyms can be found in Appendix A, which contains a compilation of the hypotheses/questions for all the analysis areas from the San Francisco UPA National Evaluation Plan.

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# 2.0 DATA SOURCES, AVAILABILITY, AND RISKS

The data to be used in assessing the role of the telecommuting/TDM element will largely involve performance monitoring data already collected by local agencies. Table 2-1 summarizes the six data elements to be utilized from existing sources. Section 2.1 identifies the data sources for the required data, Section 2.2 discusses the availability of the data and transmittal to the evaluation team, and Section 2.3 addresses risks that might be encountered in assembling the required data and the means for overcoming them.

In addition to the data described in this test plan, the telecommuting/TDM analysis will draw on the visitor/shopper survey described in the Surveys and Interviews Test Plan. Discussion about the use of the survey data in conjunction with the telecommuting/TDM data is found in Chapter 3.

As background on the data to be collected in this test plan, a brief description of the current programs and how they will be used in the UPA evaluation is presented. The DOE of the City and County of San Francisco manages an alternate commute program for employees of the city and for other businesses (employers) and their employees in downtown San Francisco. Services offered to other employers include the promotion of pre-tax commute benefits (for transit passes and vanpool fares – required to be offered by all employers with 20 or more employees), ridematching, an Emergency Ride Home (ERH) program, and bicycle promotion. This program is partially funded by the SFCTA and MTC. DOE is contracted by these agencies to perform outreach to all interested businesses in downtown San Francisco. In order to educate commuters and promote their employer TDM program and services, DOE helps organize outreach events at employer worksites, in public venues, and at related events (such as Earth Day or Carfree Day).

SFCTA has committed to work with DOE to promote key activities of the UPA project at these events and evaluate the effectiveness of this promotion. The primary form of promotion will be the distribution of materials (brochures) with information on SF*park* and MTC 511 enhancements. While the SF*park* pilot will likely affect non-work travel more than travel for work, the evaluation will seek to assess the impact of outreach materials on awareness and travel behavior related to all trip purposes. The evaluation will gauge whether the addition of the UPA initiatives will increase the effectiveness of the outreach events and whether the events become a source of information for educating travelers about the parking and 511 initiatives.

**Table 2-1. Summary of Data Needs for San Francisco Telecommuting/TDM Data Test Plan**

| Data Element* | Location | Data Granularity | Data Collection Frequency: Continuous | Data Collection Timing | | | | Data Reporting Frequency | Responsible Agency (Data Source) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Baseline | | Post-Deployment | | | |
| | | | | Begin | End | Begin | End | | |
| 1. Outreach Events | Downtown SF | # Events and Locations | X | Mid-2010 | Mid-2011 | Mid-2011 | Mid-2012 | Quarterly | City of SF DOE by SFCTA |
| 2. Materials distributed | Downtown SF | # Distributed | X | Mid-2010 | Mid-2011 | Mid-2011 | Mid-2012 | Quarterly | City of SF DOE by SFCTA |
| 3. Rideshare match requests | Downtown SF | # Requests | X | Mid-2010 | Mid-2011 | Mid-2011 | Mid-2012 | Quarterly | City of SF DOE by SFCTA |
| 4. Employer enrollment in matching | Downtown SF | # New Enrollments | X | Mid-2010 | Mid-2011 | Mid-2011 | Mid-2012 | Quarterly | City of SF DOE by SFCTA |
| 5. Employer and employee enrollment in pre-tax benefits | Downtown SF | # New Enrollments | X | Mid-2010 | Mid-2011 | Mid-2011 | Mid-2012 | Quarterly | City of SF DOE by SFCTA |
| 6. Employer enrollment in ERH | Downtown SF | # New Enrollments | X | Mid-2010 | Mid-2011 | Mid-2011 | Mid-2012 | Quarterly | City of SF DOE by SFCTA |

*Data Elements 2-6 should be reported by event, location and type of information distributed

## 2.1 Data Sources

The primary data source for the evaluation of telecommuting/TDM activities will be information collected at each DOE outreach event. DOE is required to regularly report event statistics to SFCTA in the following areas:

- Events held
- Materials (brochures, giveaways, etc.) distributed
- Rideshare matchlists requested (by completing request form)
- Employer enrollments in DOE TDM programs: a) ridesharing matching, b) pre-tax commuter benefits, and c) emergency ride home (ERH).

The assessment of materials distributed will focus on both all materials and the subset of those related to SF*park* and 511 enhancements. This information is required by the funding arrangement between SFCTA and DOE. This will be the primary source of data for outreach event related analyses.

## 2.2 Data Availability

The data required for the TDM evaluation should be readily available since it comes from existing, ongoing reporting sources.

DOE data on events, materials and enrollments should be forwarded by SFCTA to the national evaluation team once received from DOE. The data should be sent electronically in a format suitable for analysis (e.g., Excel spreadsheet). SFCTA will need to assure that brochure and other materials related to SF*park* and 511 enhancements are tracked separately in the data.

Before Data (Mid-2010 – Mid-2011)

Due to the nature of the before and after analysis, SFCTA will need to assemble data from DOE's report for events that occur during the year prior to SF*park* deployment, to include:

- A listing, dates and total number of events held
- Total materials distributed (all types of materials)
- Employer enrollment statistics (matching, benefits and ERH)

This data should be transmitted to the national evaluation team prior to SF*park* deployment to assure that the format and elements are complete, understandable, and accurate.

After Data (Mid-2011 – Mid-2012)

Data for events that occur during SF*park* deployment will include the same data as in the before case, but will also separate out the number of materials that are specific to SF*park* and 511 enhancements from total materials and report both. Data should be transmitted to the national evaluation team quarterly. Data on how parkers heard about the program and whether this was at outreach events will be included in the "after" Visitor/Shopper survey results.

## 2.3 Potential Risks

There are no significant risks foreseen to obtaining the data for this test plan. Some minor risks might include:

- Coordination among the San Francisco partners will be necessary to assure that special materials (brochures, website links, etc.) are developed on SF*park* and the 511 enhancements for distribution at DOE outreach events. These materials need to be developed by the mid-2011 launch of the parking pricing and parking information on 511.
- DOE is not an official partner in the SF UPA project and their cooperation is contingent on their contractual and day-to-day working relationship with SFCTA. Since the event monitoring data is part of DOE's regular reporting, this should not be an issue, but they will need to make a slight change in their practices to report separately on SF*park* and 511.

# 3.0 DATA ANALYSIS

Data analysis will be primarily a before/after analysis and will come in two forms, corresponding to the two principal types of data. The two main analyses will attempt to assess:

- the impact of SF*park* and 511 enhancements on outreach effectiveness – the hypotheses Tele/TDM 1 and 2.
- the use of TDM information distribution channels to influence travelers' decisions in SF*park* pilot areas – the hypothesis Tele/TDM 3.

Appropriate statistical test will be used to assess the significance of differences observed before and after the UPA projects are deployed.

Upon receipt of the data from DOE and SFCTA, the first step will be to examine the completeness and accuracy of the data. The national evaluation team will address any concerns with the data with SFCTA and DOE.

**Outreach Events.** The outreach data will be analyzed to assess whether the addition of materials related to SF*park* and 511 enhancements corresponded to increases in key city TDM performance measures related to commuter registration in ridematching and employer enrollment in key programs. This will involve analysis of these performance indicators before and after deployment. It will also involve an assessment of the relationship between the number of events and materials distributed and changes in these performance measures. The most difficult aspect of the TDM evaluation will be the interpretation of causality between outreach event activities (materials distributed) and employee and employer actions. Changes in ridematching registration or employer enrollment could also be related to other TDM program activities or exogenous variables. To the extent possible, we will attempt to document and understand these other influences and control for them in the TDM analysis.

**Visitor/Shopper Survey.** One other source of data, related to the source of information about SF*park*, will come from the visitor/shopper survey to be fielded in the pilot areas. Survey respondents will be asked how they heard about SF*park* and one possible response will be at DOE outreach events or materials received at one of these events.

Using data from the Surveys and Interviews Test Plan, results of the visitor/shopper survey will indicate whether visitors and shoppers in the SF*park* pilot areas acquired parking and transportation information at DOE outreach events and, if so, an analysis of this subgroup's travel and parking behavior will be performed. This is intended to assess the influence of information provided through DOE-related sources on parking and travel behavior downtown. Several critical survey question areas will be utilized in this analysis:

- Where the visitor/shopper first heard of SF*park* and where to find parking related information.
- Awareness and use of various sources of information

- Influence of information about parking pricing and availability on travel decisions: mode, destination, time, whether to travel
- Reported reason for change in mode or number of trips made downtown

The analysis will also take into consideration potential effects not related to the UPA projects. The Exogenous Factors Test Plan will collect data on economic conditions (unemployment and gasoline prices), non-UPA transportation system changes such as regional fare increases, construction, and other factors. Where appropriate exogenous factors data may shed light on findings in the analysis of the telecommuting/TDM data.

# 4.0 SCHEDULE AND RESPONSIBILITY

The schedule for the TDM evaluation will largely involve before and after data collection prior to analysis activities. The deployment period is mainly influenced by the initial implementation of SF*park* elements, beginning in mid-2011 with parking price changes and concomitant enhancements to 511. SFCTA and DOE are responsible for providing the data from the outreach activities to the national evaluation team. The DOE schedules events roughly three months in advance, and the evaluation team will be expecting to receive the DOE performance data on a quarterly basis for both the pre-deployment and post-deployment periods.

SFMTA and MTC are responsible for preparing the outreach material on SF*park* and the 511 enhancements for use by DOE at the outreach events. These materials will need to be prepared before the start of parking pricing and the launch of the parking information on 511 phone and website.

SFMTA is responsible for providing data from the visitor/shopper survey (as discussed in the Surveys and Interviews Test Plan) to the national evaluation team for various analyses, including the telecommuting/TDM analysis. The baseline survey occurred in the fall of 2010 and was repeated in the spring of 2011. The post-deployment survey will take place in the spring of 2012.

The national evaluation team is responsible for analysis of the data and reporting results. Data quality checking will occur as the data are received, but most of the analysis will occur when all data are available in mid-2012.

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# APPENDIX A – COMPILATION OF HYPOTHESIS/QUESTIONS FROM THE SAN FRANCISCO UPA NATIONAL EVALUATION PLAN

| Evaluation Analysis | Hypothesis/ Question Number | Hypothesis/Question |
|---|---|---|
| Congestion | SFCong-1 | The deployment of SF*park* and the 511 improvements will reduce traffic congestion on selected travel routes in the downtown area |
| | SFCong-2 | The public will perceive that congestion has been reduced |
| Pricing | SFPricing-1 | Parking pricing will increase parking availability |
| | SFPricing-2 | Parking pricing will lead to reduced search time and variability |
| | SFPricing-3 | Parking pricing will reduce double parking |
| | SFPricing-4 | Parking pricing will shorten the duration of the average on-street parking session |
| | SFPricing-5 | Parking pricing will improve reliability and speed of public transit |
| | SFPricing-6 | Parking pricing will cause a shift to other routes, modes, and other parking garages |
| Telecommuting/ TDM | SFTele/TDM-1 | TDM events will increase the demand for information about SF*park* and 511 enhancements |
| | SFTele/TDM-2 | SF*park* and 511 enhancements will increase effectiveness of TDM program |
| | SFTele/TDM-3 | Distribution of UPA-related information at events will influence parking program awareness and behavior change |
| Technology | SFTech-1 | Implementing advance parking technology will improve agency ability to manage parking |
| | SFTech-2 | Improving the dissemination of parking information via 511 phone, websites, and text messaging, will reduce parking search times |

| Evaluation Analysis | Hypothesis/ Question Number | Hypothesis/Question |
|---|---|---|
| Equity | SFEquity-1 | What are the direct social effects (parking fees, travel times, adaptation costs) for various transportation system user groups? |
| | SFEquity-2 | What is the spatial distribution of aggregate out-of-pocket and inconvenience costs, and travel-time and mobility benefits? |
| | SFEquity-3 | Are there any differential impacts on certain socioeconomic groups? |
| | SFEquity-4 | How does reinvestment of parking pricing revenues impact various transportation system users? |
| Environmental | SFEnv-1 | SF*park* will improve air quality by reducing parking search times and shifting trips from car to transit |
| | SFEnv-2 | The public will perceive an improvement in air quality resulting from SF*park* |
| | SFEnv-3 | SF*park* will reduce fuel consumption by reducing parking search times and shifting trips from car to transit |
| Goods Movement | SFGoods-1 | Commercial vehicle operator (CVO) double parking will decrease in the SF*park* areas. |
| | SFGoods-2 | CVO double parking fines will decrease in the SF*park* areas. |
| | SFGoods-3 | Parking availability, including loading and freight zones, will increase in the SF*park* areas. |
| | SFGoods-4 | Travel times will decrease in the SF*park* areas for CVOs and other vehicles. |
| Business | SFBusiness-1 | Sales will increase in the SF*park* areas. |
| | SFBusiness-2 | Overall travel to access retail and similar businesses will increase in the SF*park* areas. |

| Evaluation Analysis | Hypothesis/ Question Number | Hypothesis/Question |
|---|---|---|
| Non-Technical | SFNonTech-1 | What role did factors related to “people” play in the success of the deployment?<br>People (sponsors, champions, policy entrepreneurs, neutral conveners) |
| | SFNonTech-2 | What role did factors related to “process” play in the success of the deployment?<br>Process (forums including stakeholder outreach, meetings, alignment of policy ideas with favorable politics, and agreement on nature of the problem) |
| | SFNonTech-3 | What role did factors related to “structures” play in the success of the deployment?<br>Structures (networks, connections and partnerships, concentration of power and decision-making authority, conflict-management mechanisms, communications strategies, supportive rules and procedures) |
| | SFNonTech-4 | What role did factors related to “media” play in the success of the deployment?<br>Media (media coverage, public education) |
| | SFNonTech-5 | What role did factors related to “competencies” play in the success of the deployment?<br>Competencies (cutting across the preceding areas: persuasion, getting grants, doing research, technical/technological competencies; ability to be policy entrepreneurs; knowing how to use markets) |
| | SFNonTech-6 | Does the public support the UPA/CRD strategies as effective and appropriate ways to reduce congestion? |
| Cost Benefit | SFCBA-1 | What is the net benefit (benefits minus costs) of the UPA/CRD strategies? |

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