

San Francisco Urban Partnership Agreement

National Evaluation: Traveler Information Data Test Plan

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SAN FRANCISCO URBAN PARTNERSHIP AGREEMENT

NATIONAL EVALUATION: TRAVELER INFORMATION DATA TEST PLAN

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16. Abstract This report presents the test plan for collecting and analyzing traveler information 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 4Ts. The national evaluation focuses on projects that deal with parking pricing in downtown San Francisco and supporting technology and telecommuting/TDM projects. The SFpark 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 parking information projects. The Traveler Information Data Test Plan is based on the San Francisco UPA National Evaluation Plan. This test plan describes the traveler information data sources, data availability, and possible risks associated with the data. The methods for analyzing the traveler information data are discussed. The schedule and responsibilities for collecting, analyzing, and reporting the traveler information data are presented.					
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LIST OF ABBREVIATIONS

4Ts	Tolling, transit, telecommuting/travel demand management, and technology
CVO	Commercial vehicle operator
DOE	Department of Environment
FHWA	Federal Highway Administration
ISP	Information service provider
ITS	Intelligent transportation systems
MTC	Metropolitan Transportation Commission
PMD	Parking management district
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 traveler information 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	<p>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:</p> <ul style="list-style-type: none"> • reductions in vehicle trips made during peak/congested periods; • reductions in travel times during peak/congested periods; • reductions in congestion delay during peak/congested periods; and • reductions in the duration of congested periods.
Objective Question #2	<p>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:</p> <ul style="list-style-type: none"> • increases in facility throughput during peak/congested periods; • increases in transit ridership during peak/congested periods; • modal shifts to transit and carpools/vanpools; • traveler behavior change (e.g., shifts in time of travel, mode, route, destination, or forgoing trips); • operational impacts on parallel systems/routes; • equity impacts; • environmental impacts; • impacts on goods movement; and • effects on businesses.
Objective Question #3	<p>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?</p>
Objective Question #4	<p>What are the overall costs and benefits of the deployed set of strategies?</p>

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/travel demand management (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. There are a total of ten test plans for the San Francisco UPA national evaluation. In addition to this Traveler Information Data Test Plan, the other nine test plans focus on the following types of data: traffic, parking, transit, telecommuting/TDM, 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 traveler information data collected through this test plan. Chapter 3.0 discusses how all of the traveler information data will be analyzed and used in the national evaluation. Chapter 4.0 presents the schedule and responsibilities for collecting and analyzing the traveler information 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 evaluated¹ are described briefly below.

SFpark Variable Pricing. *SFpark* is the name given to the parking pricing system to be implemented by SFMTA. The primary goal of *SFpark* 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 *SFpark* 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 *SFpark* 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 signs² 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 ClipperSM 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.

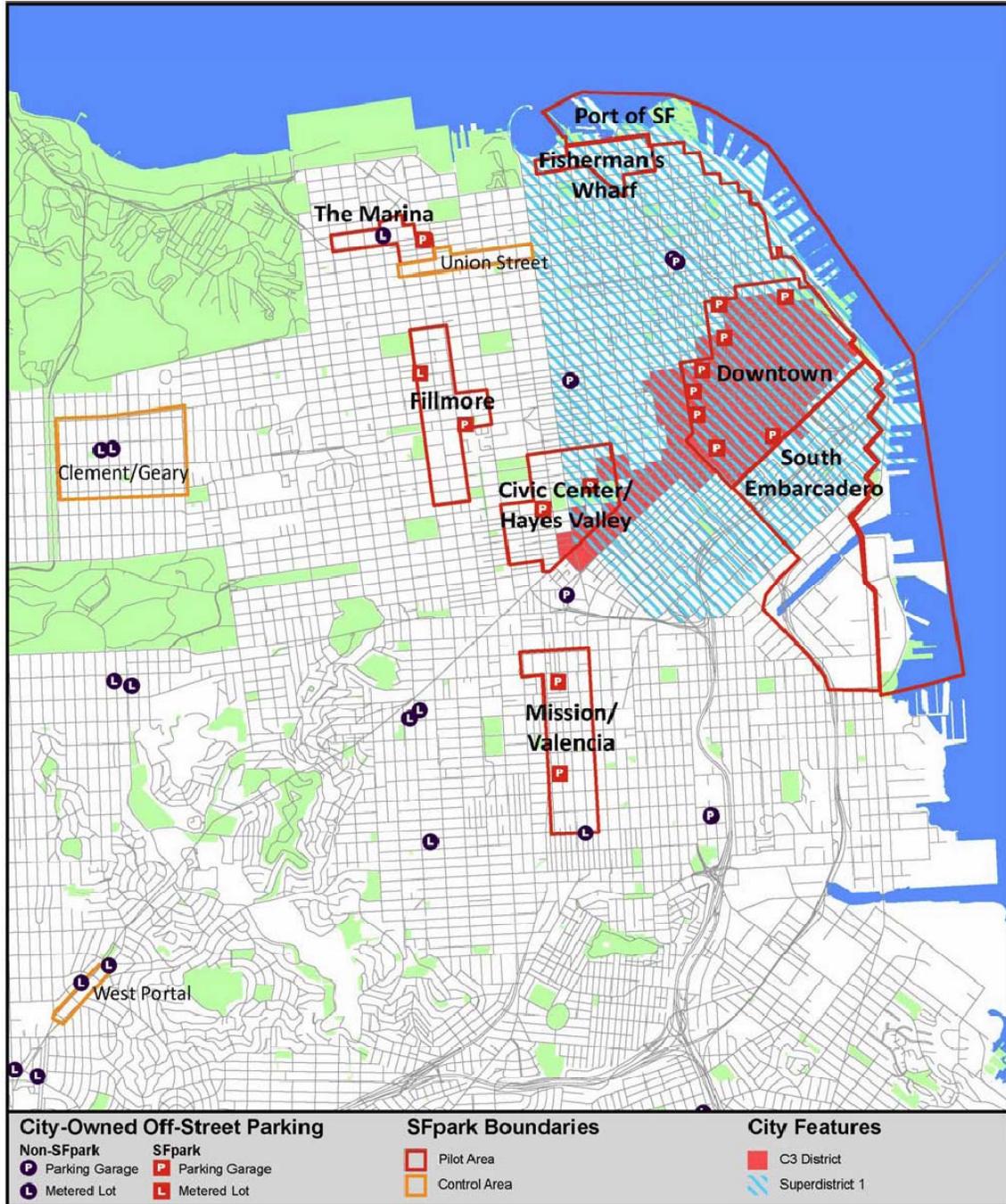


Figure 1-1. SFpark Pilot and Control Zones

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 SFpark and 511 enhancements, DOE and SFCTA plans include three activities: promotion of SFpark 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, bike-sharing 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 SFpark 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 Traveler Information 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 Traveler Information Data Test Plan will be used for technology analysis. Table 1-3 presents the traveler information data elements and measures of effectiveness and the hypotheses/questions from the related evaluation analyses that the traveler information 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. Traveler Information Test Plan Data Elements Use in Testing Evaluation Hypotheses/Questions

San Francisco Traveler Information Data Element	San Francisco UPA Measure of Effectiveness	San Francisco UPA Hypotheses/Questions*
1. Website Utilization (Session Frequency)	<ul style="list-style-type: none"> • Number of sessions accessing parking information 	<ul style="list-style-type: none"> • SFTech-2
2. Website Utilization (Session Duration)	<ul style="list-style-type: none"> • Average duration of parking information sessions 	<ul style="list-style-type: none"> • SFTech-2
3. SMS (Text) Message Utilization	<ul style="list-style-type: none"> • Number of parking text messages sent per month per parking garage 	<ul style="list-style-type: none"> • SFTech-2
4. Phone Requests	<ul style="list-style-type: none"> • Number of calls to 511 requesting parking information per month per facility 	<ul style="list-style-type: none"> • SFTech-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

This chapter identifies the sources for the traveler information data and discusses the availability of those data and any potential risks associated with collecting and processing them for use in the evaluation. Table 2-1 summarizes the traveler information data requirements for the San Francisco UPA national evaluation. The details associated with source, timing and other particulars are discussed in the sections that follow.

Table 2-1. Summary of Traveler Information Data Used the San Francisco UPA Evaluation

Data Element	Data Granularity	Data Collection Frequency	Data Reporting Frequency	Data Source
1. Website Utilization (Session Frequency)	Monthly	Hourly	Quarterly	SFMTA Parking Website Logs
	Daily/ Weekly	Hourly	Quarterly	MTC 511 Website Logs
2. Website Utilization (Session Duration)	Monthly	Hourly	Quarterly	SFMTA Parking Website Logs
	Daily/ Weekly	Hourly	Quarterly	MTC 511 Website Logs
3. SMS (Text) Message Utilization by Garage	Monthly	Hourly	Quarterly	SFMTA SMS (Text) Messaging System Logs
4. Phone Requests by Facility	Weekly	Hourly	Quarterly	MTC 511 Phone Logs

2.1 Data Sources

As part of the San Francisco UPA deployment, the local partners will be disseminating information about parking pricing and space availability through the following means:

- A parking information system operated by SFMTA which includes both a website and a text messaging system that provide real-time pricing and availability information, and
- Inclusion of parking information in the existing 511 phone system and website operated by MTC.

SFMTA's data warehouse will supply the parking-related data to the traveler information systems.

The national evaluation will assess the degree to which travelers use information technologies to access information on parking in downtown San Francisco. Travelers' usage of the technologies and the information they provide over time will serve as a gauge of their popularity. Travelers presumably will use the information they obtain in their decisions about travel and parking. It

should be noted that the survey of visitors and shoppers (described in the Surveys and Interviews Test Plan) will ask travelers directly about their experience with these information technologies.

The evaluation will rely upon data from a number of sources including the following:

- *SFpark* website logs
- *SFpark* SMS /text messaging logs
- MTC 511 website logs, and
- MTC 511 call logs.

Each of these sources of data is discussed below.

SFpark Website Logs. SFMTA plans to implement their own webpage where travelers can access information on parking. SFMTA will keep logs of how this website is used and will prepare monthly reports summarizing the following information:

- The number of web sessions in which individuals queried information about parking by facility and by time of day.
- The average duration of web sessions in which individuals queried information about parking by facility and by time of day.

SFpark SMS/Text Messaging Logs. SFMTA plans to develop their own text messaging system to disseminate parking pricing and availability information upon request. SFMTA plans to generate a log that captures the number of SMS/Text messages broadcast by time of day and by parking garage.

MTC 511 Website Logs. Parking information will also be incorporated into MTC's existing 511 website. The MTC will provide to the national evaluation team a monthly report that summarizes the following:

- The number of web sessions and page views in which individuals queried information about parking by facility and by time of day.
- The average duration of web sessions where individuals queried information about parking by facility and by time of day.

MTC 511 Call logs. MTC will prepare a monthly report that provides two tabulations: 1) the number of requests for parking related information by time of day, and 2) the number of requests for parking related information by facility.

2.2 Data Availability

These data are understood by the national evaluation team to be readily available from both SFMTA and MTC. For their website application, the national evaluation team requests that SFMTA incorporate data gathering requirements into the planning and design of their new website. SFMTA plans to maintain a log of texting activity for the system that they develop, and MTC has indicated that providing the information requested can be incorporated into their normal reporting process.

2.3 Potential Risks

For the most part, there do not appear to be significant risks associated with the availability of traveler information data. All agencies are aware of the data being requested for the national evaluation and are incorporating the data into their standard data reporting processes. However, a potential for deployment schedule slippage exists, as described in Table 2-2, which could in turn affect the availability of data needed for the evaluation.

Table 2-2. Potential Risks to Deployment and Availability of Evaluation Data

Risk	Responsible Agency	Mitigation
The schedule for implementing 511 phone and web enhancements could slip due to multiple contractors needing to communicate and integrate their work.	MTC	MTC has transferred some responsibilities from Telvent to SAIC, the new 511 contractor. That will eliminate the need to integrate work from two contractors.
The <i>SFpark</i> data warehouse got a late start due to lengthy contract negotiation with the vendor. Potential exists for delay in implementing portions of the warehouse that will feed data to the traveler information technologies.	SFMTA	No mitigation identified. However, this risk has diminished due to slippage in other parts of the <i>SFpark</i> deployment, thereby allowing the data warehouse schedule to catch up.
Installation of parking sensors, parking meters, and roadway sensors may take longer than planned, thereby creating potential delay in data sent to the data warehouse.	SFMTA	SFMTA has included penalty clauses in contract with sensor vendor to meet installation deadlines. Parking meter vendor will supply meters for initial parking zones right away, with the rest of the meters supplied as quantities are manufactured.
<i>SFpark</i> technology may not perform to the standard required for real-time information delivery from the sensors to the data warehouse.	SFMTA	SFMTA has identified alternate vendors for parking sensors to address performance issues in certain locations.

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3.0 DATA ANALYSIS

The traveler information system data will be used in the technology analysis to track post-deployment patterns in the ways parking information is disseminated by the local partners and accessed by travelers. Upon receipt of the data the national evaluation team will perform quality checks to determine if the data are complete and within the expected ranges. Data analysis will focus on developing, from the raw data, the following measures of effectiveness:

- Number of sessions for parking information per month for both 511.org and SFpark websites
- Average duration of session for parking information
- Number of phone requests for parking information via 511
- Number of parking text messages sent (per month) from SFMTA

The number of user sessions, text messages and and phone requests will be tracked by facility and by time of day over time to see how utilization of the traveler information system changed over the evaluation period. This will be done by developing standard histograms of device utilization. This information will be correlated with parking turnover and space utilization data to determine if drivers' use of these devices promotes better distribution of parking demand between the different parking management districts (PMDs). The analysis of the use of parking information systems will also be compared to responses in the visitor/shopper survey, which will measure a traveler's reported frequency of use of these systems and the perceived usefulness of the information for travel decisions. If parking information systems use increases over the evaluation period as travelers become more familiar with them as an aid to travel decisions, one would expect to see that reflected in the survey responses. In addition, comparison of trends in baseline data for 511 phone and web usage with the post-deployment usage will indicate if a noticeable increase in 511 information requests occurred following the availability of parking information on 511.

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4.0 SCHEDULE AND RESPONSIBILITY

The data that will be used in this test plan will come from manual or automated logs of the different systems (i.e., the websites and phone usage logs, etc.) as well as SFMTA's data warehouse. SFMTA plans to include in the data warehouse information about use of their website and text messaging for parking information. MTC will be responsible for providing information related to use of parking information associated with *SFpark* on the 511 phone and webpage. It is expected that the national evaluation team would receive information from these agencies quarterly. The national evaluation team will be responsible for analyzing and reporting on the data. Table 4-1 presents the data collection schedule based on a mid-2011 start date for parking information available on the traveler information systems.

Table 4-1. Traveler Information System Data Collection Schedule

Project Element	Baseline Data	Post-Deployment Data
SF <i>park</i> Website and Text Messaging	none	Mid-2011 – Mid-2012
511 Phone Logs and Usage Reports	2010 and 2011 up to deployment date of enhancements	Mid-2011 – Mid-2011
511 Website	2010 and 2011 up to deployment date of enhancements	Late 2011 – 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 <i>SFpark</i> and the 511 improvements will reduce traffic congestion on selected travel routes in the downtown area.
	SFCong-2	Travelers 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 <i>SFpark</i> and 511 enhancements.
	SFTele/TDM-2	<i>SFpark</i> 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	<i>SFpark</i> 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 <i>SFpark</i> .
	SFEnv-3	<i>SFpark</i> 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 <i>SFpark</i> areas.
	SFGoods-2	CVO double parking fines will decrease in the <i>SFpark</i> areas.
	SFGoods-3	Parking availability, including loading and freight zones, will increase in the <i>SFpark</i> areas.
	SFGoods-4	Travel times will decrease in the <i>SFpark</i> areas for CVOs and other vehicles.
Business	SFBusiness-1	Sales will increase in the <i>SFpark</i> areas.
	SFBusiness-2	Overall travel to access retail and similar businesses will increase in the <i>SFpark</i> 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? People (sponsors, champions, policy entrepreneurs, neutral conveners)
	SFNonTech-2	What role did factors related to “process” play in the success of the deployment? 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? 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? Media (media coverage, public education).
	SFNonTech-5	What role did factors related to “competencies” play in the success of the deployment? 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 strategies as effective and appropriate ways to reduce congestion?
Cost Benefit	SFCBA-1	What is the net benefit (benefits minus costs) of the UPA strategies?

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