



# Memorandum

**Date:** June 21, 2019  
**To:** Transportation Authority Board  
**From:** Rachel Hiatt – Principal Planner  
**Subject:** 7/23/19 Board Meeting: Adopt the Crooked Street Reservations & Pricing Program Study and Authorize the Executive Director to Advance the Recommendations of the Study, Including Seeking Necessary Legislation and Funding Identification.

<p><b>RECOMMENDATION</b>    <input type="checkbox"/> Information    <input checked="" type="checkbox"/> Action</p> <ul style="list-style-type: none"> <li>• Adopt the Recommendations of the Crooked Street Reservations &amp; Pricing Program Study</li> <li>• Authorize the Executive Director to advance the recommendations of the study, including seeking necessary legislation and funding identification.</li> </ul> <p><b>SUMMARY</b></p> <p>The neighborhood surrounding the Crooked Street experiences significant vehicle congestion and pedestrian crowding for a significant portion of the year, as a result of the nearly 2 million visitors per year to the block. In 2017, the Transportation Authority Board directed staff to explore the potential effectiveness and design of a Crooked Street Reservation &amp; Pricing System. This study finds that requiring vehicles to secure a paid reservation to drive the Crooked Street, along with active management of this system, could substantially address the vehicle congestion in the neighborhood and support related safety, quality of life, and fiscal self-sufficiency goals. Pending the approval of enabling state legislation that is being considered in Sacramento, San Francisco could potentially pilot a paid reservation system as soon as 2020.</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Fund Allocation</li> <li><input type="checkbox"/> Fund Programming</li> <li><input type="checkbox"/> Policy/Legislation</li> <li><input checked="" type="checkbox"/> Plan/Study</li> <li><input type="checkbox"/> Capital Project Oversight/Delivery</li> <li><input type="checkbox"/> Budget/Finance</li> <li><input type="checkbox"/> Contract/Agreement</li> <li><input type="checkbox"/> Other:</li> </ul> <hr/>
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**DISCUSSION**

**Background.**

The 1000 Block of Lombard Street, known as the “Crooked Street,” is both a residential neighborhood and one of the most iconic and most popular tourist destinations in San Francisco, attracting 2.1 million visitors a year. The increasing volume of visitors in the last several years has put a significant strain on the Russian Hill neighborhood’s transportation infrastructure, resulting in automobile and pedestrian congestion that negatively impacts the quality of life of neighborhood residents. Visitors in line to drive down the Crooked Street are also experiencing increased wait times to drive down the block, often exceeding 45 minutes on the busiest days.

## Agenda Item 13

To address this situation, the Transportation Authority completed the Managing Access to the Crooked Street Study in 2017 (2017 Access study), which was requested by then-Commissioner Mark Farrell.

The 2017 Access study outlined four key recommendations to improve area conditions:

- Improved enforcement of existing regulations
- Engagement of tourism industry as partners in visitor management
- Engineering and circulation improvements
- Reservations & pricing to manage automobile demand

Following adoption of the 2017 Access study, Commissioner Farrell requested a follow-on study to explore the potential effectiveness and design of a Crooked Street Reservation & Pricing System, using District 2 Prop K Neighborhood Transportation Improvement Program (NTIP) funds.

The NTIP funds were matched with \$250,000 in city general funds, administered via the San Francisco Municipal Transportation Agency (SFMTA), which participated closely in the study as a project partner.

This item summarizes the results of the Reservation and Pricing study.

### **Discussion.**

The purpose of the subject study was to further develop the proposal to manage automobile traffic congestion on and around the Crooked Street by requiring visitors in cars to pay a fee, make a reservation, or to do both.

### Goals

This proposal carries forward the goals from the 2017 Access study, which included:

- Manage Automobile Congestion
- Maintain Livability of the Surrounding Neighborhood
- Manage Pedestrian Congestion
- Ensure Traffic Safety
- Implement a Financially Viable Solution
- Preserve Tourism at a Sustainable Level

Although a Pricing and Reservation strategy is geared to respond to managing vehicle congestion, the study includes all goals to help understand how such a program would affect each goal area and where additional improvements or investments to complement the system would be warranted.

### Scope & Approach

The scope of work for the study called for a robust round of data collection to support development of system components and operational rules, an initial screening of potentially feasible operational approaches, consultation with neighborhood groups, tourists and the tourism industry, and the

development of a draft Concept of Operations document that would outline an initially feasible operational approach, including business rules, user interactions, agency roles, and costs.

#### Data Collection

The study team led a data collection effort in summer and fall of 2018 that collected information on vehicle and pedestrian volumes, crowding and congestion, and the time it takes to access the Crooked Street by car at any given time of day. Additionally, in August 2018, the study team administered an intercept survey to approximately 400 vehicles visiting the Crooked Street over one weekend. The survey aimed to gauge visitors' willingness to engage with a reservation system and their willingness to pay a fee, and at what level, in exchange for a significant reduction in wait times.

The results of this data collection effort both confirmed and expanded the findings of the 2017 Access study. Of particular note, this effort found that vehicle queuing over 45 minutes in length exists nearly all day on the busiest weekends and found that consistent pedestrian crowding at the top and bottom of the Crooked Street occurs during the same busy time periods. Most visitors expressed a willingness to pay \$5 per car in exchange for significantly reduced wait times, and results also indicated that most visitors who are unable or unwilling to secure a reservation would still visit the Crooked Street, either by arriving by a different mode or parking nearby and walking.

#### Evaluation

Using the results of the data collection effort, the study team developed and analyzed a suite of high-level potential operational approaches and compared these against the goals of the program. After considering approaches including a no-cost reservation, a demand-based variable price, a paid reservation plus the option to pay a demand-based variable price, and a fixed price paid reservation, the team found that only the paid reservation approach could be expected to effectively reduce vehicle congestion while also being sufficiently easy to understand for visitors and straightforward and sustainable to administer and operate.

The study team then developed two potential scenarios for the implementation of a paid reservation system.

- Scenario 1, driven by community input, called for the system to be operational 24 hours a day, 7 days a week, every day of the year and to be enforced via an automated, camera-based system. This scenario assumed a reservation cost of \$5 at all times.
- Scenario 2, built around the times and amounts of congestion documented in the data collection, called for the system to be operational from 9:00 a.m. to 9:00 p.m. 7 days a week, every day of the year and to be enforced either via an automated, camera-based system or by on-site staff who would verify reservations and manage vehicles (similar to the approach used at Muir Woods to manage parking reservations since January 2018). This scenario assumed a reservation cost of \$5 on non-holiday weekdays and \$10 on weekends and holidays to manage demand and encourage those with flexible schedules to visit during less busy times.

The evaluation of these scenarios found that both would substantially resolve the vehicle queueing stemming from the Crooked Street and be financially self-sustaining. Some expected visitors in vehicles are projected to shift their visit earlier or later, and some are projected to instead visit the street on foot, increasing pedestrian crowding and congestion and contributing to increases in pickup

and drop off activity that could increase the incidence of blocked crosswalks or cable car tracks. This scenario could be managed with program staff and SFMTA Parking Control Officers (PCOs).

The study team also performed a focused assessment of the pros and cons of an automated versus staffed system, and found that a staffed system would be more effective (minimizing potential accidental violations of system rules) and more visitor-friendly (real people would be on site and able to assist with making a reservation or answer questions), and comparable in cost to an automated system.

### Outreach

Throughout 2019, the study team has continued to engage neighborhood organizations, members of the public, and representatives of the tourism industry. In January, the study team attended a meeting of Russian Hill neighborhood organizations to present the preliminary results of the evaluation. Together with Commissioner Stefani, staff also hosted a public open house to share the results with the public on January 30. Following the open house, staff posted meeting materials, including the feedback form from the open house, to the project website.

Feedback from neighborhood groups and members of the public indicated continued support for the reservation and pricing system, as well as a clear preference for the use of on-site staff in implementing and enforcing such a system. Tourism industry representatives, through SF Travel, have provided valuable feedback to the study team with respect to the importance of the ability for visitors to be able to make close-in and last minute reservations, rather than having all potential reservations sold-out far in advance (as is a common occurrence for the ferry to Alcatraz Island, for example.) This and other feedback is reflected in the Draft Concept of Operations for the Paid Reservation system detailing how the system could work, including potential discounts and exemptions.

### Findings & Recommendations

Based on the technical evaluation and feedback received, the study team recommends a paid reservation system, enforced by staff on site, with up to 12-hour operation (9:00 a.m. to 9:00 p.m.) at peak seasons, and a predictable tiered price structure (higher on holidays and weekends, lower during regular weekdays). The study finds that such a system is likely to address the recurrent vehicle congestion stemming from the Crooked Street's popularity as a tourist attraction and improve the quality of life for neighborhood residents while still maximizing the amount visitors who can experience the street for themselves, and providing a better tourist experience. In addition, the system is projected to be financially self-sustaining through use of the revenue from the reservation fee to cover the costs of system operation, administration, and staffing.

Initial cost estimates include approximately \$500,000 of one-time system set-up and initialization costs, with approximately \$2,000,000 per year in ongoing yearly costs which are offset by an estimated revenue stream stemming from the paid reservations of \$2,100,000 per year. Complementary capital investments are additionally recommended on the 1100 block of Lombard to ensure safe pedestrian access and program operations.

It is important to recognize that the recommendations in this phase of work are based on the best available information to date, and the system is expected to perform successfully with reasonable confidence. However, given the novelty of this approach, the ultimate system operator and managing

entity should provide continuous monitoring and evaluation, and be prepared to adjust operational parameters flexibly, as warranted.

#### Next Steps

Pending state legislation (Assembly Bill (AB) 1605 (Ting)) is a prerequisite for the implementation of a program as recommended in this study. The final shape of the legislation will impact the exact next steps, but the current form of the bill would require the Board of Supervisors to conduct additional outreach and approve an ordinance that designates an operating agency for the system. This operating agency would then be responsible for securing funding, necessary approvals (including legislation of any traffic circulation changes by the SFMTA Board), and appropriate interagency agreements while also developing and adopting final operational and business rules and undertaking procurement.

#### **FINANCIAL IMPACT**

Continuation of pre-implementation planning and Board support for the development of an ordinance as specified in AB 1605 would have an impact on the proposed Fiscal Year 2019/20 budget. We are working with the District 2 office to identify additional funding for this work, which will be incorporated in the mid-year budget update.

#### **CAC POSITION**

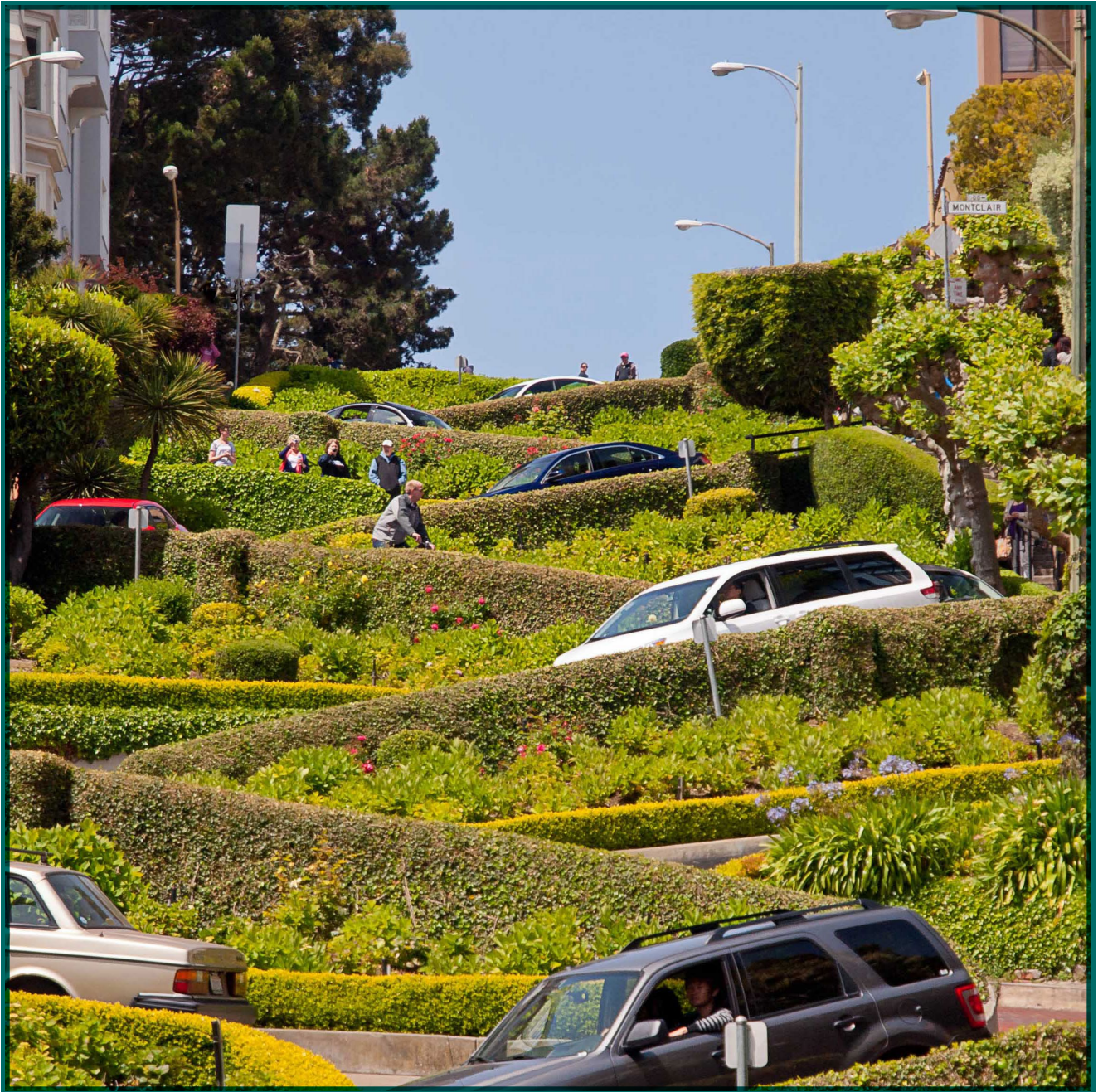
The CAC will consider this item at June 26, 2019 meeting.

#### **SUPPLEMENTAL MATERIALS**

Attachment 1 – Lombard Crooked Street Reservation & Pricing Program Summary Report

Enclosure 1 – Lombard Paid Reservation System Draft Concept of Operations





LOMBARD CROOKED STREET

# Reservation and Pricing System Study



San Francisco  
County Transportation  
Authority

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Draft Report  
JUNE 21, 2019

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## Introduction

The 1000 Block of Lombard Street, known as the “Crooked Street,” is both a residential neighborhood and one of the most iconic and most popular tourist destinations in San Francisco, attracting 2.1 million visitors a year. The increasing volume of visitors in the last several years has put a significant strain on the neighborhood's transportation infrastructure, resulting in automobile and pedestrian congestion that negatively impacts the quality of life of neighborhood residents. Visitors in line to drive down the Crooked Street are also experiencing increased wait times to drive down the block, often exceeding 45 minutes on the busiest days.

There have been several past attempts to address the transportation and livability concerns on and around the Crooked Street. The most recent planning study was completed by the San Francisco County Transportation Authority in 2017. The Managing Access to the Crooked Street Study (hereon referred to as 2017 study) was requested by former Transportation Authority Commissioner Mark Farrell and made possible with Proposition K local transportation sales tax funds from the Transportation Authority's Neighborhood Transportation Improvement Program (NTIP).

When the line extends past Polk, cars may wait as long as 45 minutes to go down the crooked street



Through that study, Transportation Authority staff identified the following challenges stemming from the increasing number of visitors to the Crooked Street:

- Traffic backing up into surrounding neighborhoods, affecting vehicle circulation in the area despite the presence of MTA Parking Control Officers (PCOs).
- Heavy foot traffic causing overflow from sidewalks into the streets and high-stress situations for people walking and driving.
- Cable cars struggling to navigate smoothly and safely.
- Other quality of life concerns, such as littering, loitering, and poor/worsening air quality.

The 2017 study outlined four key recommendations, informed by data collection on existing conditions as well as engagement with neighborhood, visitors, and tour industry professionals:

1. Improved enforcement of existing regulations
2. Engagement of tourism industry as partners in visitor management
3. Engineering and circulation improvements
4. Reservations and pricing to manage automobile demand

Results from in-person and online outreach for the 2017 study showed that over two-thirds of participants supported the reservation and pricing system recommendation. Following the completion and adoption of the 2017 study, the Transportation Authority Board directed staff to further explore the potential details, functionality, and outcomes of a reservation and pricing system. This report summarizes the findings from that follow-on Crooked Street Reservation and Pricing System Study and recommends a potential set of initial operating parameters should such a system be implemented.



## Goals

As part of the 2017 study, Transportation Authority staff identified several goals by which to analyze any potential improvements to the Crooked Street. These goals were developed considering existing conditions at the time and with input from stakeholders. The study team has continued to use these goals in the current effort to develop and evaluate the reservation and pricing system. The goals and associated metrics used to evaluate reservation and pricing System alternatives are shown in the table below:

GOAL	METRIC	TARGET	
		MINIMUM	IDEAL
<b>Manage automobile congestion</b>	Time vehicle queue extends west past Larkin Street (1 block) in each hour of the week	Time vehicle queue extends past Larkin is no more than 15 total minutes in any given hour	Vehicle queue does not extend beyond 1100 block of Lombard Street
<b>Maintain the livability of the surrounding neighborhood</b>	Revenue generated	Revenue beyond operating costs greater or equal to current cost of services (PCOs, ambassadors)	Revenue beyond operating costs greater or equal to the cost of expanded services such as PCOs, Police Officers, and related to manage impact of visitors on neighborhood
<b>Manage pedestrian congestion</b>	Percentage of pedestrians lingering in intersection crosswalks for excessive periods of time (i.e., crossing significantly more slowly than a typical walking speed [3 ft/s])	Less than 15% of pedestrians linger in crosswalks for excessive periods of time	Less than 10% of pedestrians linger in crosswalks for excessive periods of time
<b>Ensure traffic safety</b>	Extent to which pick-ups/ drop-offs block cable cars, pedestrians/ crosswalks, or automobiles	Pick-ups and drop-offs do not block travel lanes or sidewalks more than 15 total minutes in any given hour	All pick-ups and drop-offs do not block travel lanes or sidewalks
<b>Implement a financially viable solution</b>	Revenue generated	Revenue covers basic operations and maintenance costs of the pricing and reservations system	Revenue beyond operating costs greater or equal to the cost of expanded services such as PCOs, Police Officers, and related to manage impact of visitors on neighborhood
<b>Preserve tourism at a sustainable level</b>	Number of visitors per day	Number of visitors that allows the system to meet other minimum targets, given proposed improvements	Number of visitors that allows the system to meet other ideal targets, given proposed improvements

Although a pricing and reservation strategy is geared to respond to managing vehicle congestion, the study includes all goals to help understand how such a program would affect each goal area and where additional improvements or investments to complement the system would be warranted.

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## Data Collection

Previous studies completed between 2000 and 2016, as documented in the 2017 study, established key information regarding problems with automobile and pedestrian circulation in the study area. The study team began the development of a reservation and pricing system with additional data collection. The objectives of the new data collection were to:

- Refresh and expand the data from the 2017 study, including asking those visiting by car more specific questions about a potential reservation and pricing system.
- Provide a data-driven understanding of the scale and scope of transportation issues in the area.
- Use data collected to develop operational rules for the system.

### METHODOLOGY

The new data collection for the reservation and pricing system included two main elements<sup>1</sup>:

#### Vehicle and pedestrian volumes:

- Observations of vehicle queues along Lombard Street, upstream of the crooked portion of the street, conducted by video camera between for one weekend in August 2018.
- Vehicle volumes and the time pedestrians linger at the intersections of Lombard/Hyde and Lombard/Leavenworth, conducted by video detection between late August and mid-October 2018.
- The amount of time vehicles take to drive on the Crooked Street and the streets leading up to it, collected via Google Directions API between early August and late September 2018.

#### Intercept survey targeting nearly 400 vehicles visiting the Crooked Street during one weekend in August 2018:

- The survey asked about their willingness to engage with a reservation system and willingness to pay a fee in exchange for significantly reducing or eliminating wait times

<sup>1</sup> Details can be found in the Lombard Crooked Street Data Collection Plan Technical Memorandum

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## KEY DATA COLLECTION FINDINGS

Data collected in 2018 generally supported previous findings and provided further insight into traffic and pedestrian characteristics by time of day and day of the week. After analyzing the data, the study team came to the following key findings<sup>2</sup>:

**All day vehicle queues on busiest days:** Motorists visiting the Crooked Street queue for about 10 hours per day on the busiest days, with the queue taking over 45 minutes for a vehicle from the time it joins the line to driving down the Crooked Street.

**Consistent pedestrian crowding:** During similar times of day, there is significant pedestrian crowding, particularly at the bottom of the street. The crowding at the bottom of the street is the factor that limits the capacity of the street for vehicles. A queue can still form even when pedestrian crowding does not delay vehicles.

**Strong willingness to pay a \$5 reservation:** Survey respondents were each randomly presented one of four possible prices (\$5, \$10, \$15, and \$20). More than half of those asked said that they were willing to pay \$5 per car for a reservation to visit if there were no wait.

**Tourists would continue to visit:** If a system were in place but a visitor either couldn't make a reservation or didn't want to pay, most would still visit the Crooked Street by parking nearby, getting dropped off, taking transit, walking, or some other way.

<sup>2</sup> Details and complete results can be found in the Lombard Crooked Street Data Collection Summary Technical Memorandum.

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## Alternatives Evaluation

The 2017 study included a high-level assessment of the overall feasibility of using reservations, a fee, or both to help manage automobile access to the Crooked Street. Before developing a detailed operational strategy for evaluation, the study team first assessed how each high-level operating scheme would perform against the goals of the study. The following options were evaluated:

**Pricing Only:** A pricing only approach would seek to manage the volume of vehicles arriving at the Crooked Street by matching price to demand, with the price increasing until demand matched the capacity of the street.

**Reservation Only:** A reservation only approach would limit access to the street to only those who have made a reservation, and only offer a number of reservations that matches the capacity of the street, limiting the amount of congestion and queuing of vehicles that would result. There would be no charge for the reservation in this option.

**Pricing Plus Paid Reservation:** This approach combines elements of the previous two options. This option would offer reservations for a low fixed fee, with the amount of reservations offered limited to below the capacity of the street. Additionally, if a visitor was unable or unwilling to make a reservation, they could arrive and pay the demand-based price with no reservation, with the price level set to limit demand for the remaining capacity of the street.

**Paid Reservation Only:** This approach would permit access to the Crooked Street only to those vehicles who have made a pre-purchased reservation before arriving at the street. This option anticipates a relatively low cost per reservation, set to recover the costs of operating the system, not at a level that would be expected to significantly change demand.

Each scenario assumed that Crooked Street residents, their visitors, and emergency/utility vehicles would continue to access the street with no restrictions.

# Screening Analysis Results

The results of the initial assessment of these options are shown in the table below.

GOAL	OPERATIONAL APPROACHES			
	PRICING ONLY	RESERVATION ONLY	PRICING PLUS PAID RESERVATION	PAID RESERVATION
<p><b>Manage Automobile Congestion</b></p> <p>Eliminate long queues near Lombard Street</p>	<p>↔</p> <p>Price could shorten queues, but vehicles will still arrive unmanaged.</p>	<p>↑</p> <p>Vehicles are given a timed reservation, matching arrivals to the capacity of the street. Queuing and congestion will be managed.</p>	<p>↔</p> <p>Non-reservation price could deter arrivals without a reservation, but vehicles will still arrive unmanaged. Unmanaged arrivals could undermine the efficacy of the reservation component</p>	<p>↑</p> <p>Vehicles are given a timed reservation, matching arrivals to the capacity of the street. Queuing and congestion will be managed.</p>
<p><b>Implement a Financially Viable Solution</b></p> <p>Cover the costs of existing staffing at the site</p>	<p>↑</p> <p>All vehicles (within hours of operation) would pay, providing funds for existing site operations, enforcement and maintenance.</p>	<p>↓</p> <p>No funds would be collected for site operations, enforcement, and maintenance.</p>	<p>↑</p> <p>All vehicles (within hours of operation) would pay, providing funds for existing site operations, enforcement and maintenance.</p>	<p>↑</p> <p>All vehicles would pay, providing funds for existing site operations, enforcement and maintenance.</p>
<p><b>Maintain the Livability of the Surrounding Neighborhood</b></p> <p>Create a self-sustaining system and generate revenue for upgrades</p>	<p>↔</p> <p>Revenue would be generated, but livability could be compromised due to uncertainty about managing vehicle arrivals and reduction in congestion.</p>	<p>↓</p> <p>While the system may manage vehicle arrivals, the absence of revenue would not provide for further investments in livability improvements.</p>	<p>↔</p> <p>Revenue would be generated, but livability could be compromised due to uncertainty about managing vehicle arrivals and reduction in congestion.</p>	<p>↑</p> <p>Paid reservations provide the most flexibility to manage vehicle arrivals while generating additional revenue for investments in livability improvements.</p>
<p><b>Preserve Tourism at a Sustainable Level</b></p> <p>Preserve the number of visitors per day</p>	<p>↔</p> <p>Not having the ability to plan a trip in advance may not be the friendliest option for tourism and the price would likely need to be high to deter visitation above capacity, but revenue would be generated to fund resources for the site.</p>	<p>↔</p> <p>Visitors can reserve a time and plan their trip in advance, but no revenue would be generated to fund resources for the site.</p>	<p>↓</p> <p>Allowing visitors to arrive without a reservation could compromise the integrity of the reservation system and create confusing rules, regulations, and expectations for visitors.</p>	<p>↑</p> <p>Visitors will be provided with a clear set of expectations and be able to plan trips in advance. Revenue would be generated to fund resources for the site.</p>



Based on the results of this initial assessment, the study team advanced the paid reservation operational concept for further refinement and analysis<sup>3</sup>.

Considering the data collected in summer and fall 2018 and the feedback from neighborhood residents during community outreach, the study team developed two potential operational scenarios for the paid reservation concept, one which maximizes understandability and another which is tailored to match the demands observed on and around the Crooked Street:

	<b>LOMBARD TODAY</b> Existing conditions	<b>SCENARIO 1</b> (24 / 7) Easy to Understand	<b>SCENARIO 2</b> (9am - 9pm) Driven by Demand
<b>NUMBER OF RESERVABLE SLOTS</b>	Unlimited	40 per half hour slot, staggered start (~ 160/hour) (e.g. 1:00 - 1:30, 1:15 - 1:45, 1:30 - 2:00, 1:45 - 2:15)	
<b>HOURS/DAYS OF OPERATION</b>	None	24/7	9AM - 9PM, 7 days a week
<b>RESERVATION PRICE</b>	N/A	\$5 all times	\$5 Mon - Fri \$10 Sat, Sun, Holidays
<b>CROOKED STREET RESIDENT EXEMPTION</b>	N/A	Yes	
<b>VARIATIONS TESTED</b>	N/A	\$0 reservation cost for San Francisco residents	

**Under Scenario 1**, the system would operate 24 hours a day, 7 days a week, every day of the year, with a flat \$5 price for reservations. This scenario would require automated enforcement, in the form of cameras and mailed violation notices, as it would not be practicable or affordable to staff the reservation system during early morning, evening, and overnight hours.

**Under Scenario 2**, the system would operate from 9:00 a.m. to 9:00 p.m., 7 days a week, every day of the year, with reservations priced to encourage those with flexible schedules to visit during less busy times – \$5 weekdays, and \$10 weekends and holidays. Because of the more limited hours of operation, this system could be enforced either by staff on site, like at Muir Woods<sup>4</sup>, or by an automated system similar to Scenario 1.



















**Note:** The prices in each scenario are representative for this analysis, and are based on “willingness to pay” data collected in summer 2018 through intercept surveys of visitors in cars (as described in the data collection section). These amounts may differ from precise amounts adopted by any eventual system administrator, who will be required to match revenue to (but not exceed or fall short of) the recovery of system operations costs. Although price varies in these scenarios, the effectiveness in reducing vehicle queues is the result of capacity-constrained reservation system.

<sup>3</sup> Details of this screening can be found in the Operational Scenario Screening & Development technical memorandum.

<sup>4</sup> For more information on the National Park Service’s Parking and Shuttle Reservation Program for Muir Woods, see: <https://www.nps.gov/muwo/planyourvisit/reservations.htm#whyparking>

## Detailed Analysis Results







When these more detailed operational scenarios were evaluated against the study goals, their performance was substantially similar, both meeting the goal of managing the automobile queue to an acceptable length while increasing the number of visitors arriving by transit, on foot, or parking & being dropped off nearby.

GOAL	PERFORMANCE		
	EXISTING	SCENARIO 1 (24 / 7)	SCENARIO 2 (9AM - 9PM)
Manage automobile congestion	 Vehicle queue extends upstream of Larkin St at least six hours per day each day of the week.	 Vehicle queue not expected to extend beyond Larkin Street, given peak (weekend afternoon) arrival flow of 175 vehicles/hr.	 Vehicle queue not expected to extend beyond Larkin Street, given peak (weekend afternoon) arrival flow of 160 vehicles/hr.
Maintain the livability of the surrounding neighborhood	 No revenue generated.	 \$35K - \$40K per week	 \$40K - \$45K per week
Manage pedestrian congestion	 At Lombard St & Hyde St, only approximately 15% of pedestrians occupy the crosswalks linger in the crosswalks.  At Lombard St & Leavenworth St, over 45% of pedestrians linger in the crosswalk.	 During a peak hour (Saturday afternoon), 290 visitors/hour are expected to visit as a pedestrian instead of drive.  With increased volumes of pedestrians overall, crowding of pedestrian space is expected to get worse.	 During a peak hour (Saturday afternoon), 410 visitors/hour are expected to visit as a pedestrian instead of drive.  With increased volumes of pedestrians overall, crowding of pedestrian space is expected to get worse.
Ensure traffic safety	 Pick-up / drop-off activity frequently obstructs pedestrians, cable car, and other car traffic.	 During weekend afternoon peak hour, 70 visitors/hour are projected to get dropped off instead of drive.  Obstructing pick-up / drop-off activity expected to increase accordingly.	 During weekend afternoon peak hour, 100 visitors/hour are projected to get dropped off instead of drive.  Obstructing pick-up / drop-off activity expected to increase accordingly.
Implement a financially viable solution	 No revenue generated.	 \$35K - \$40K per week	 \$40K - \$45K per week
Preserve tourism at a sustainable level	 21,000 people/day: 6,500/day by car, 14,500/day by foot	 20,000 people/day, -5%: 4,000/day by car, 16,000/day by foot.	 20,000 people/day, -5%: 3,700/day by car, 16,300/day by foot.

Evaluation details can be found in the Scenario Performance technical memorandum.

The results of this analysis were presented at a community open house meeting in January 2019, followed by various one-on-one conversations with interested groups and stakeholders. Members of the public could also submit comments and questions via an online feedback form, posted along with the meeting materials on the Transportation Authority’s website. Feedback from this meeting indicated continued support for the reservation and pricing system, as well as a clear preference for the use of on-site staff in implementing and enforcing such a system.

The study team also performed a focused assessment of the pros and cons of an automated versus staffed system, and found that a staffed system would be more effective (minimizing potential accidental violations), more visitor-friendly (real people would be on site and able to assist or answer questions), and comparable in cost to an automated system.

FACTOR	PERFORMANCE	
	AUTOMATED	STAFFED
<b>Effectiveness</b>	 <p>High potential for accidental violations given camera-based enforcement with no physical barrier.</p>	 <p>Presence of staff minimizes potential violations through active traffic control and enforcement of regulations</p>
<b>Visitor Friendliness</b>	 <p>Reservation requirement communicated only via signage which may go unnoticed or be misunderstood. Potential for visitors to accidentally violate system rules, resulting in a violation notice by mail weeks after a visit.</p>	 <p>On site staff can provide information about reservation requirement, and will direct vehicles without reservations away from the Crooked Street, eliminating accidental violations. Any citable violations will be enforced in person, on site, rather than by mail.</p>
<b>Ease of Administration</b>	 <p>Potential for accidental violations could significantly increase administration costs to support customer service, mailing, and processing.</p>	 <p>On site staff costs are recurring and predictable</p>

### RECOMMENDED SCENARIO

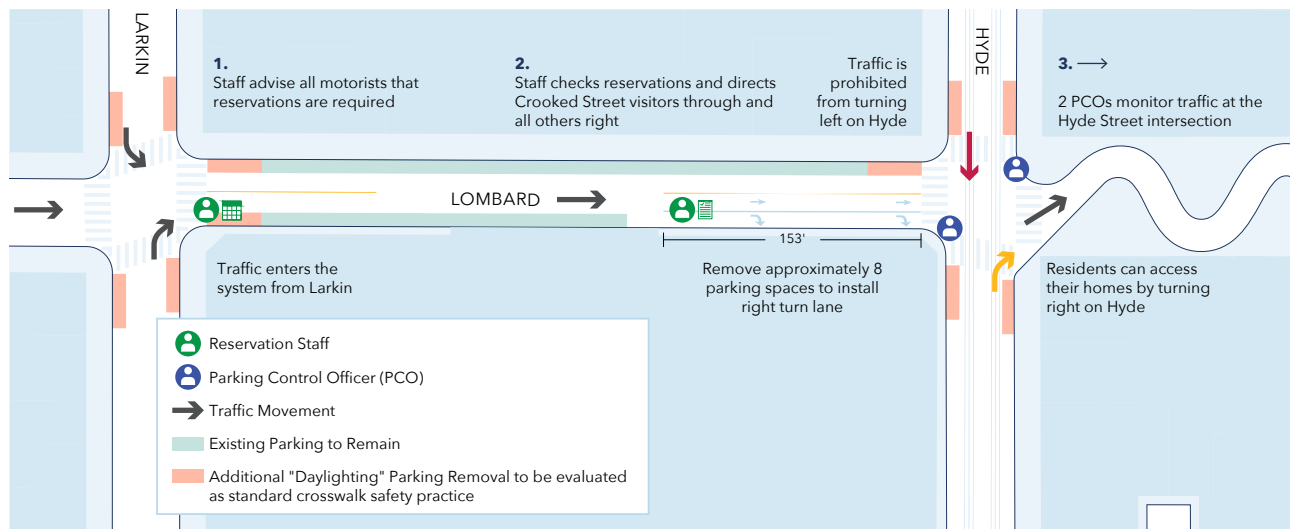
Based on the enforcement approach assessment and feedback received, the study team recommends a paid reservation system, enforced by staff on site, with 9:00 a.m. to 9:00 p.m. operating hours and a predictable tiered price structure (higher on holidays and weekends, lower during regular weekdays).

It is important to recognize that the recommendations in this report are based on the best available information to date, and the system is expected to perform successfully with reasonable confidence. However, the system operator and implementing entity should provide for continuous monitoring and evaluation and be prepared to adjust operational parameters flexibly, as warranted to ensure both program effectiveness and financial viability. For example, if the operator notes that many visitors are consistently arriving early for their reservations, they can extend a grace period without impacting the overall outcome of the system<sup>5</sup>.

<sup>5</sup> Other potential operational challenges, along with recommended approaches to resolve them, are explored in the Lombard Paid Reservation System Concept of Operations document.

## Visitor Experience in Recommended Scenario

The figure below illustrates the proposed traffic flow and staff locations during operations of the paid reservation system<sup>6</sup>.



As illustrated in the diagram, the operation of the system depends on the presence of PCOs<sup>7</sup> to help direct traffic and two or more reservation system staff members (who are not PCOs) that will verify reservations on site. Additionally, to manage the flow of vehicles, this design proposes removing a minimum of eight on-street parking spaces on Lombard near the intersection of Lombard and Hyde to create a right-turn-only lane for vehicles without reservations to be directed away from the street.

Under this proposal vehicles will be processed through the system in the following steps:

- 1. Notify drivers:** Reservation staff will be responsible for notifying drivers at Larkin and Lombard who wish to proceed eastbound towards the Crooked Street that reservations are required, and can provide informational cards for those that wish to attempt to make a reservation immediately or return at a later time. Vehicles that wish to continue, however, will not be turned away at this point.

<sup>6</sup> This scheme is provided to illustrate one potential workable concept that is the recommendation of this study. Final street configuration and staffing levels will be determined by the agency designated as the system administrator and the SFMTA based further refinement of this recommendation.

<sup>7</sup> The study team recommends launching the system with one to five PCOs depending on day of week and time of year. The system operator will refine PCO requirements based on actual operations.

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2. **Verify reservation:** Mid-block between Larkin and Hyde, a reservation staff member will use a handheld scanner to check the reservation status of vehicles. Those with valid reservations will be directed into the straight-ahead-only lane, and will be directed through the Lombard and Hyde intersection and down the Crooked Street by PCOs when it is safe to proceed. Those without reservations will be directed to the right-turn-only lane, and PCOs will direct these vehicles to make the right turn onto southbound Hyde when it is safe to do so.
  3. **Direct vehicles away from site:** At the bottom of the Crooked Street and the Lombard and Leavenworth intersection, additional PCOs will direct traffic away from the site once a visit is completed.

Different groups will interact with the system in different ways during operations:

**Tourists:** Those wishing to visit the Crooked Street by vehicle for tourism purposes will need to make and pay for a reservation online, by phone, or via an approved retail location before arriving at the Crooked Street. As a result, marketing will be an important industry coordination activity and contractor requirement. Feedback from the tourism industry stressed the importance of the ability to make reservations throughout the leadup to any given day, and the project team recommends that reservations be made available in a tiered fashion (for example: 75% of reservations released one month prior, 20% of reservations released one week prior, and 5% of reservations released day-of.)

**Residents:** Residents of the Crooked Street and Montclair Terrace will receive passes that may be a wallet card, rearview mirror hanger, or similar identification. As with current regulations, this pass will allow residents to access the Crooked Street by making a right turn from northbound Hyde, bypassing the reservation system altogether.

**Guests of Residents:** Long term/frequent guests of residents, such as childcare professionals, home health aides, etc. will be eligible for a pass similar to those provided for residents. One time or infrequent visitors will need to be provided a visitor pass, either electronically via resident log-in or in person via a booklet of paper passes that may be available to residents for their use, that will be presented to the reservation staff. One time or infrequent visitors will not be permitted to make the right turn from northbound Hyde.

**Commercial vehicles & other deliveries:** Commercial vehicles are currently restricted from the Crooked Street at all times. This restriction would continue, and vehicles would need to park nearby and complete their final delivery on foot.



**Taxis & Transportation Network Companies (TNCs):** Vehicles such as taxis and TNCs will require a reservation to drive down the Crooked Street. The driver or any passenger in the vehicle is eligible to make this reservation (for example, a visitor without a car may still elect to reserve a space and hire a taxi to drive them down the street).

**Emergency vehicles, utilities, and other marked service vehicles:** Emergency vehicles, vehicles performing service for public utilities, and other government/service vehicles will be allowed unrestricted access to the Crooked Street at all times.

### **ACCESS FOR LOW INCOME VISITORS AND THOSE WITH MOBILITY LIMITATIONS**

The study team has evaluated options to ensure that the Crooked Street remains accessible to the greatest number of visitors possible without overwhelming the surrounding streets and neighborhood. It's important to note that this proposal is only for those driving the street in vehicles – access will remain completely free and unrestricted to those who walk, bike, take transit, or get dropped off nearby. Nevertheless, we recognize that the grade of the street itself presents mobility challenges to some visitors, and propose two potential strategies to address these challenges:

**Including an ADA access option when making reservations:** Like Muir Woods, the reservation booking system would reserve a limited number of slots per time period for ADA access. While those reserving these slots would still pay the standard reservation cost at that time, setting aside a certain number would ensure that visitors who may be unable to navigate the street on foot may still visit.

**Engaging with San Francisco Public Library to offer free passes:** San Francisco Public Library's "Discover & Go" program offers a limited number of free passes to area museums to San Francisco residents through their library card. Lombard Crooked Street may be added as an attraction to this program, offering a limited number of no-cost reservations to the community.

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## Next Steps

While this document lays out a feasible set of operating parameters for a paid reservation system that are anticipated to be successful in managing automobile congestion at and around the Crooked Street, additional steps are required before any operations of such a system may become operational.

**State legislation:** Current California Vehicle Code prohibits two essential components of the proposed operations of the system: charging a fee for access to a public right of way that is currently available at no cost and restricting some vehicles while allowing others from a public street. AB 1605 (Ting) has been introduced in the 2019 - 2020 State Legislative Session and would exempt the Crooked Street from these regulations for the purposes of a seven-year pilot of a reservation system. As currently written, the legislation would require the San Francisco Board of Supervisors to designate a management agency, which would be responsible for adopting the final operating rules of and implementing the system. As this legislation is still under consideration, the California Legislative Information website should be consulted for the latest on this bill.

**Local ordinance & approvals:** As noted in the state legislation section, the San Francisco Board of Supervisors must pass an ordinance designating a management agency who will adopt final policies and oversee the implementation and operations of this system. Additionally, changes to traffic circulation must be approved by the SFMTA Board. The program, as a whole, is also subject to environmental review under CEQA, though it is anticipated that the project elements taken together are environmentally beneficial and would have few, if any, impacts.

**Funding and administration:** Once designated, the operating agency must complete final cost estimations, identify and secure funding for startup costs (including initial operating costs), and procure any necessary vendors to assist with implementation of the program. The study team recommends that the Board of Supervisors designate the operating agency as early as possible to allow for early engagement with potential project funders and vendors who may have early feedback on an initial procurement.

Initial cost estimates completed as part of this study for system startup and operation are summarized below:

INITIAL COST & REVENUE ESTIMATES (SUBJECT TO FURTHER REFINEMENT)	
One-Time Costs (Final system planning, design, procurement, and start-up)	\$500,000
Yearly Costs (Including reservation staff, SFMTA PCO staff, marketing, PCO staff, and monitoring/administration)	\$2,000,000
Yearly Revenue (Assuming \$5 weekday and \$10 weekend reservation cost)	\$2,100,000

An initial estimate of revenue generated by the system, assuming \$5 weekday and \$10 weekend reservation costs, is approximately \$2,100,000.

The study team recommends that at least one year of operating costs be included in the one-time start up costs of the system when seeking funding. By including these costs up front, the system operator will ensure that the revenue from reservation sales matches the expenses of operating the system, and can adjust accordingly for future years of operation.

Commissioner Stefani has identified \$600,000 in Prop K NTIP funding for District 2 towards the estimated \$2,500,000 initial cost. The study team is working to secure additional funding to close the remaining \$1,900,000 funding gap or could scale the initial pilot down to focus on highest demand days or hours to test program effectiveness and gauge financial sustainability.

## Implementation Timeline

Pending state and local legislation, as well as funding availability, an initial system could be in operation by Spring 2020. The timeline below illustrates these steps:

