Monday, November 29, 2021

California Public Utilities Commission
Consumer Protection and Enforcement Division
505 Van Ness Avenue
San Francisco, CA 94102

via electronic mail only
douglas.ito@cpuc.ca.gov
AVprograms@cpuc.ca.gov

Re: Comments on Cruise Application for Driverless Deployment Permit – Tier 3 Advice Letter

I. Introduction

The San Francisco Municipal Transportation Agency (SFMTA), the San Francisco County Transportation Authority (SFCTA), and the San Francisco Mayor's Office on Disability (collectively "San Francisco" or "City"), submit these comments concerning the Cruise Application for a Driverless Deployment Permit – Tier 3 Advice Letter and its attachments ("Cruise Advice Letter").

The most common claim among developers of automated driving systems is the claim that automated drivers will be superior drivers that increase compliance with traffic laws and improve safety on public roads. While San Francisco remains hopeful and optimistic that driving automation can and ultimately will improve road safety, recent developments have given San Francisco concern that the Cruise automated driving system is not currently designed to comply with state and local traffic regulations that govern passenger services Cruise proposes to deploy commercially in San Francisco.

After receiving DMV authorization for commercial deployment in early November, Cruise released two public videos (the "Cruise Videos") showing driverless operations in which stops for passenger pick up and drop off are routinely conducted in travel lanes. [1] This is true even when curb space specifically dedicated to passenger loading and unloading is immediately available. Vehicles stopped in travel lanes create safety risks both to Cruise passengers, especially those

[1] The first Cruise Video (approximately 8 minutes) can be found here:
https://www.youtube.com/watch?v=dmvZBiWYkFQ
The second Cruise Video (approximately 18 minutes) can be found here:
https://www.youtube.com/watch?v=svebS-uR7wc

with disabilities, and to other road users, including pedestrians, cyclists, and other motorists. They also interfere with the flow of all traffic, extend travel times, increase congestion and slow transit vehicles. Because of these hazards and obstructions, both the California Vehicle Code and the San Francisco Transportation Code generally prohibit stops for passenger pick up and drop off in travel lanes, crosswalks, and other unsafe areas and establish rules of the road that regulate the safe movement of vehicles. Rather than demonstrating driving superior to human driving, the Cruise Videos elevate passenger convenience over the safety and convenience of *all* road users.

The Commission's approval of applications for both testing and deployment permits is premised on compliance with underlying DMV requirements and applicable state and local traffic laws.[2] The underlying DMV regulations relevant to the Cruise Advice Letter more specifically require a deployment permit applicant to certify that its autonomous technology "*is designed to detect and respond to roadway situations in compliance with all provisions of the California Vehicle Code and local regulation applicable to . . . driving. . . in the vehicle's operational design domain. . . .*"[3]

The Cruise Videos create a strong inference that the Cruise AV does not currently meet this standard and suggests that approval of the Advice Letter is premature.[4] San Francisco urges CPED staff to investigate the capacity of the Cruise AV to make stops for passenger pick ups and drop offs and perform other driving tasks in a way that complies with state and local law. We offer suggested questions for Cruise in Exhibit B and urge CPED to convene discussion with San Francisco, as well as with Cruise, about these questions, since Cruise intends to operate in San Francisco.

In addition to concerns about the safety and compliance of Cruise passenger service operations, as discussed further below, the City also has concerns about how Cruise plans to commercially deploy AV services in an equitable and non-discriminatory manner. We suggest questions for further investigation of these issues in Exhibit C. We further note material errors in the map of the Initial Operational Design Domain. Cruise states that the initial ODD "does not contain any active heavy rail crossings, and streets with light rail are excluded from AV routable streets."[5] The large majority of the Muni "N Judah" light rail line runs on surface streets within the Initial Service Area, yet the approximately 3.4 miles of Irving Street, Ninth Avenue and Judah Street are not marked as an Excluded Street in Section 8.1 of the Cruise Passenger Safety Plan.

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[2] See, Decision 20-11-046 (as modified by D.21-05-017, "the Modified Decision"), Order paragraphs 1, 5b, 7b & 18; CPUC General Order 157-E, Section 1.06; "Driverless Pilot and Phase I Deployment Programs: Application Instructions & Requirements for Permit Holders 1.0, last updated October 26, 2021" (''CPUC Application Instructions") at page 10.
[3] California Code of Regulations (CCR) § 228.06(a)(9)
[4] By copy of this letter, San Francisco is informing DMV of these concerns.
[5] Cruise Advice Letter, Attachment 2, Passenger Safety Plan, page 17.

II. CPED Staff Should Further Investigate Cruise Compliance with Traffic Regulations Before Making a Recommendation on the Cruise Advice Letter.

Background: Cruise DMV Deployment Permit

On March 29, 2021, the California Department of Motor Vehicles (DMV) received from Cruise LLC an Application seeking authorization to commercially deploy 30 "Cruise AVs" on public streets in San Francisco. The application sought authority to operate in an initial service area identified in the Advice Letter (Initial Operational Design Domain) and thereafter on public streets throughout the City (Citywide Operational Design Domain).[6] On September 30, 2021, the DMV issued a letter to Cruise LLC authorizing Cruise to commercially deploy the Cruise AV in accordance with the terms of the application as of that date.[7]

Background: Cruise Passenger Service Testing and San Francisco Street Regulation

While Cruise has tested the Cruise AV extensively in San Francisco,[8] based on Cruise reports to the Commission through August 31, 2021, Cruise testing of passenger service in San Francisco has been extremely limited. The Advice Letter seeks authority for commercial deployment of driverless service after a total of *52.4 miles of passenger services testing* and a total of *17 reported test passengers*.[9] We do not know how many of these 17 passengers – if any – were members of the public (as opposed to Cruise employees or agents). Further, it appears that all of these rides were provided in a vehicle with a safety driver.[10] San Francisco has no information about the safety or compliance of the stops made to load or unload these

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[6] See Cruise Advice Letter, Attachment 2, Passenger Safety Plan, page 40.

[7] The DMV letter to Cruise does not explicitly state whether it authorizes service only in the Initial Operational Design Domain or in the Citywide Operational Design Domain. San Francisco's concerns apply equally to the Cruise request for authority as to both the Initial Operational Design Domain and the Citywide Operational Design Domain.

[8] Cruise reported to DMV more than 1.6 million miles driven for the period between December 2019 through November 2020. While DMV does not require permittees to document the jurisdiction in which automated miles are driven, we understand the large majority of these miles – if not all of them – have been driven on San Francisco streets.

[9] The Cruise quarterly reports on passenger service testing submitted pursuant to CPUC Decisions 18-05-043 and 20-11-046 (as modified by Decision 21-05-017), can be found here: https://www.cpuc.ca.gov/regulatory-services/licensing/transportation-licensing-and-analysis-branch/autonomous-vehicle-carrier-pilot/quarterly-reporting

[10] The Commission has issued both drivered and driverless test permits to Cruise. They are listed on the CPUC website with the same permit number: 39080. See https://www.cpuc.ca.gov/regulatory-services/licensing/transportation-licensing-and-analysis-branch/autonomous-vehicle-carrier-pilot/autonomous-vehicle-program-permits-issued. The quarterly reports carry the permit number 39080A – which appears to relate to the drivered test permit.

17 passengers; however, San Francisco's review of the Cruise Videos subsequently released contains substantial evidence of non-compliance with state and local traffic codes.

As a vibrant city that has very high population density, serves as a regional center for jobs and commerce, and supports the seventh largest transit system in the country, San Francisco street space – the largest body of real estate in the city – is highly prized by many users. This is true as to both travel lanes and as to the curb space adjacent to travel lanes that provides essential access to businesses and residences. San Francisco regulates the use of street space, curb space and sidewalk space in an effort to manage competing uses while maximizing public safety, as well as pursuing other city and state climate, equity, economic, accessibility and environmental goals. There are many elements of this regulation, including, for example:

- Safety-informed allocation of curb space for transit vehicle stops, commuter shuttle stops, passenger zones (for pick up and drop off of passengers by anyone), short term metered and unmetered parking, commercial vehicle loading, general loading zones (for passengers and goods), parking for people with disabilities, motorcycle parking, etc.;
- Safety-informed allocation of street and sidewalk space for bike share docks, bicycle parking and scooter and other device parking;
- Safety-informed design, installation and maintenance of bicycle lanes, pedestrian crossings, curb ramps and dozens of other features that provide access to sidewalks for pedestrians, including people who use wheelchairs;
- Safety-informed design, installation and maintenance of colored curbs and signs that advise the public of proper uses of street space along the curb, as well as traffic signs and lights, and overhead wires that provide overhead power for transit vehicles
- Safety-informed approval of public requests for temporary closures of streets for community events and construction activities and temporary modifications of traffic controls to accommodate First Amendment activities and/or travel to and dispersal from major public events; and

After engineering review for safety and compliance, legal review, and public input from affected residents and businesses, the SFMTA makes changes to authorized street and curb uses *at every semi-monthly public meeting* of its Board of Directors, at semi-monthly Engineering Public Hearings, and at monthly Color Curb hearings. In each case, SFMTA analysis seeks to ensure the safety of the public streets for all users. For every design or traffic modification, SFMTA engineers consider the history of injuries and fatalities in the particular location and/or on similar streets. These judgments are affected by factors such as the street type and size, its role in the overall street network, and the adjoining land uses in the particular location.

For many reasons, including the emergence of new modes of transportation in San Francisco (e.g., shared cars, bikes and scooters, TNC service), in 2020, the SFMTA adopted a

Curb Management Strategy that establishes citywide policy for accommodating competing uses of curb space based on characteristics of the adjoining land uses.[11] Among other things, the Curb Management Strategy seeks to accommodate growing loading needs, increase compliance with parking and loading regulations, and promote equity and accessibility. The SFMTA started implementing the policies in the Curb Management Strategy shortly before the pandemic with an initial focus on corridors in which major public and/or private capital projects were underway. For example, the Curb Management Strategy guided extensive planning for high volumes of transit and vehicle traffic in connection with events at the new Chase Center. The Curb Management Strategy was issued immediately before the COVID pandemic, and in the early days of the pandemic, San Francisco adopted regulations providing new and alternative emergency uses of street and sidewalk space to provide safe spaces for travel and commerce (e.g., the Shared Spaces Program).

Parking Control officers employed by the SFMTA and Police officers employed by the San Francisco Police Department enforce compliance with California Vehicle Code and City parking and traffic regulations to protect public safety for all users of the public rights of way, to ensure turnover in commercial districts and to manage street congestion.

Consistent with state and local law, San Francisco expects automated driving systems to have the technical ability to comply with all applicable permanent and temporary street regulations and to be programmed to recognize and comply with all applicable permanent and temporary street regulations, except where otherwise directed by city traffic control or public safety officers. ***On San Francisco's congested streets, in order to operate in a lawful manner, vehicles operated by automated driving systems will need the technical ability to search for and recognize lawful on-street parking spaces, to parallel park in a typical parking or loading space with an average length of 20 feet, and to pull into driveways, parking lots and garages. Vehicles that do not have these capabilities are not ready for commercial deployment of AV Passenger Services in San Francisco in either the Initial Operational Design Domain or the Citywide Operational Design Domain.***

Background: State and Local Law Relevant to Stopping, Standing and Parking

The California Vehicle Code ("Vehicle Code" or "CVC") establishes uniform rules of the road for vehicles using dedicated public streets in California. In some cases, Vehicle Code provisions are self-executing in local jurisdictions; in other cases, the Vehicle Code authorizes local authorities to adopt ordinances or resolutions to implement its provisions. Without additional knowledge of how Cruise AVs will operate on San Francisco streets, the City cannot

[11] The SFMTA Curb Management Strategy can be accessed here: https://www.sfmta.com/sites/default/files/reports-and-documents/2020/02/curb_management_strategy_report.pdf

evaluate the various Vehicle Code provisions that may be implicated by Cruise driving and stopping, but, at a minimum, the Cruise Videos demonstrate a failure to follow laws governing the loading and unloading of passengers. These failures create unsafe conditions on busy City corridors that affect AV passengers, passengers and drivers of other vehicles, transit vehicles, pedestrians and cyclists.

The Vehicle Code includes broad prohibitions on vehicles stopping, standing or parking in the street including but not limited to stopping, standing or parking in crosswalks, in front of driveways, in a bus stop or other red zone, in a transit only lane, or to double park. ((See, e.g. CVC Section 22500; 22507.2, 21458. More specifically, the Vehicle Code contains a prohibition on parking more than 18 inches from the curb, with a narrow exception for commercial vehicles where it "is reasonably necessary to accomplish the loading or unloading of ... passengers." (CVC 22502). The Vehicle Code also allows local jurisdictions to establish areas in business districts where commercial vehicles cannot stop more than 18 inches from the curb for any reason including loading and unloading where the local jurisdiction has posted signs. (CVC Section 22502.) San Francisco has implemented this provision and posted signs in numerous business districts that prohibit commercial loading and unloading of passengers more than 18 inches from the curb. (See S.F. Trans Code Section 7.2.85.)

The Vehicle Code also authorizes local agencies to designate appropriate use of curbs by colored paint. The Vehicle Code proscribes the uses for white, yellow, green, blue and red curbs. (See, CVC Section 21458.) Passenger loading is prohibited in the blue and red curb zones, but is explicitly lawful in white zones, in yellow zones during active loading, and in green zones subject to limited times. (CVC Section 21458.) Loading is also permitted in all metered and unmetered parking spaces (most of which are not marked by curb paint), including spaces where residential permits are available to avoid time limits otherwise applicable to street parking.[12] And, the Vehicle Code includes a number of prohibitions related to driving that impedes the safe flow of traffic and transit including but not limited to prohibitions for driving at such a slow speed as to impede or block the normal and reasonable movement of traffic, driving in a transit only, or driving in an HOV lane. (See, CVC § 22400; CVC 21655.1; CVC Section 21655.5.)

Cruise Advice Letter information on passenger pick up and drop off operations

The Cruise Advice Letter contains almost no information about a driving behavior that is critical to Cruise's business goals: stopping to pick up and drop off passengers. The Cruise

[12] We note the omission of curb colors – an essential element of curb regulation – from the following Cruise statement: "Roadway features like traffic lights, stop signs, lane merges, and markings are embedded in on-board maps and detected in real-time by the AV's sensors so they can be obeyed. Cruise also keeps its on-board map up-to-date so that our AVs maintain current information about the road. Advice Letter, Passenger Safety Plan page 5.

Passenger Safety Plan states only "If there is insufficient space for the vehicle to stop at pick up, the Cruise AV will select a nearby area with adequate space to stop to pick up the passenger"[13] It makes no mention of whether such "nearby areas" are designated for or otherwise lawful locations to stop. Rather, the Cruise Videos suggests that Cruise has concluded that the convenience of its customers is always sufficient to meet the "reasonably necessary" standard provided in Section 22502 of the California Vehicle Code, and that Cruise has no need to search for or even consider lawful spaces to stop for this purpose. Cruise apparently plans to prioritize loading and unloading only in relation to passenger convenience, even where that may violate traffic laws.

The Cruise Advice Letter states further that "Cruise has also designed and implemented policies and procedures to minimize risk for all passengers and residents in the areas we serve, including people with disabilities."[14] With respect to the essential driving behavior of loading and unloading passengers, this statement can be given little credence in light of the evidence in the Cruise Videos. Together, the Cruise Videos document fourteen total stops for pick up or drop off of passengers; they provide evidence that not a single one of these stops complied with the requirements of the Vehicle Code and Transportation Code. This record is especially problematic for people with disabilities, for whom curbside access is essential. San Francisco provides a detailed analysis of these stops documented in the Cruise Videos in Exhibit A. In some instances, there are colored curbs or other lawful spaces for pick up and drop off stops within the immediate vicinity of the unlawful stop, and in no case does the Cruise Video suggest that Cruise vehicles are actively searching for lawful stopping locations.[15] (See screen shots from the Cruise Videos in Exhibit A). A summary is provided in Table 1 below:

Table 1: Summary of Driverless Test Rides Documented in Cruise Videos.

Pickup/Drop-off	Timestamp	Description
Cruise Video #1		
P1	2:34	Stops in travel lane to pick up passenger on California between Buchanan & Webster
D1	7:15	Stops in travel lane to drop off passenger on Divisadero between Grove & Hayes
Cruise Video #2		
P1	4:06-4:24	Stops in travel lane for pick up on California between Webster & Buchannan
D1	6:51	Stops in travel lane for drop off on Divisadero between Hayes and Grove
P2	7:36	Stops in travel lane to pick up at 625 Divisadero, between Grove & Hayes

[13] Cruise Advice Letter, *PSP Section 4.4. Passenger safe ingress and egress.*

[14] Cruise Advice Letter, page 2

[15] Indeed, in Video 1 the passenger states "We are pulling over here -- right in front of the Independent. That is pretty cool."

D2	10:11	Stops in a travel lane to drop off on California between Buchannan & Webster
P3	11:21	Stops in a travel lane to pick up passengers on California between Webster & Buchannan
D3	12:35	Stops in a travel lane to drop off passengers on Sutter between Baker & Lyon
P4	13:13	Stops in a travel lane to pick up at Sutter between Baker & Lyon
D4	14:21	Stops in a travel lane to drop off passengers on Pierce between Pine & Bush
P5	14:54	Stops in a travel lane to pick up passengers on Pierce between Bush & Sutter
D5	15:48	Stops in a travel lane to drop off passengers on Presidio between Bush & Pine
P6	16:40	Stops in a travel lane to pick up passengers on Presidio between Pine & Bush
D6	18:41	Stops in a travel lane to drop off passengers on California between Buchannan & Webster

Errors of Judgment by Human Drivers Offer No Safe Harbor for the Cruise AV

Some may suggest that these driving behaviors are common among human drivers. This is correct, and the hazards and obstructions created by unlawful stops on San Francisco roads contribute to a safety crisis on city streets. San Francisco enforcement efforts and implementation of the SFMTA Curb Management Strategy seek to improve compliance with law and limit unlawful stops, but human drivers take a chance that they will be cited when they stop unlawfully – and they often are. Automated driving developers must not program errors in human judgment into robot cars *as standard driving practice*. Where will this practice stop? Will automated vehicles observe speed limits when there is no enforcement staff on hand to ensure compliance?

The Cruise Videos create a strong inference that the Cruise AV is not currently designed to comply with applicable state and local traffic laws while conducting the passenger services Cruise proposes to deploy commercially in San Francisco. These errors create safety risks to passengers and other road users. San Francisco believes CPED staff should obtain additional information before recommending approval of the Cruise Advice Letter because the Commission's Driverless Deployment Permit requires compliance with traffic regulations.[16] Based on San Francisco experience, we offer a list of questions that should be addressed as Exhibit B.

[16] See, e.g., D.20-11-046 (as modified by D.21-05-017) at 82 and Ordering Paragraph 18 (requiring permit applicant to "demonstrate compliance" with GO 157-E, which requires permit holders to comply with the Vehicle Code); ibid. at Ordering Paragraph 7 (requiring Phase 1 permit holders to certify compliance with all DMV regulations, which includes California Code of Regulations (CCR) § 228.06(a)(9), and to "comply with all other applicable State and Federal regulations."

If CPED staff is inclined to recommend approval of the Advice Letter after such investigation, we urge the Commission to limit service to the Initial Operational Design Domain, including both the service area, the number of vehicles (30) and the hours of operation (10pm to 6am) and to require a subsequent Advice Letter for any change to these parameters, including but not limited to an expansion of the Initial Operational Design Domain.

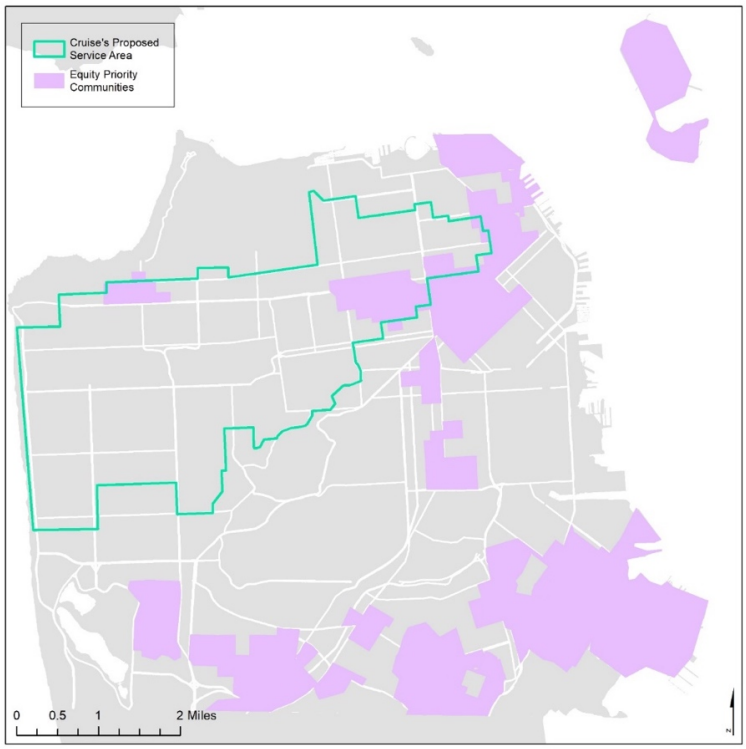
III. CPED staff should seek further information about Cruise plans for providing non-discriminatory passenger service before making a recommendation on the Cruise Advice Letter.

As was just discussed, Cruise quarterly reports to the Commission document that the company's testing of passenger service has been extremely limited. This testing provides no evidence that Cruise is prepared to provide service in a way that supports the Commission's goals for AV Passenger Services – "to expand the benefits of AV technologies to. . . people with disabilities" and to "improve transportation options for all, particularly disadvantaged communities and low-income communities."

With respect to ongoing plans to provide transportation services to disadvantaged and low income communities, the Cruise Advice Letter notes only that Cruise plans to allocate "at least 1 percent of Cruise's zero-emissions AV fleet in service of low-income and disadvantaged communities in San Francisco. . . ."[17] The low income and disadvantaged population of San Francisco far exceeds 1 percent; approximately 10 percent of San Francisco households fall below the poverty level.[18] As shown in Figure 1, the Cruise Initial Service Area excludes nearly all of San Francisco's designated Equity Priority Communities. In addition, the Initial Service Area does not reflect San Francisco's racial and ethnic diversity. While the proposed service area contains approximately 33 percent of the City's population, it contains only 19 percent of its Hispanic population and 24 percent of its Black population.

[17] Cruise Advice Letter, p. 2
[18] Census ACS 5-year 2015-2019. Table B17021 Poverty Status of Individuals in the Past 12 Months by Living Arrangement. Accessed through data.census.gov.

Figure 1: Cruise Initial Service Area in Relation to Equity Priority Communities



With respect to expanding the benefits of AV technologies to people with disabilities, Cruise reports to the CPUC demonstrate that the company has not conducted *any* testing of wheelchair accessible trips.

Table 1: Summary of Cruise Passenger service Testing Quarterly Reports to CPUC

Period Start	Period End	Vehicle Miles	Passengers	Wheelchair Accessible Trips
11/1/2019	1/31/2020			
2/1/2020	4/30/2020	6.8	3	
5/1/2020	7/31/2020			
8/1/2020	10/31/2020			
11/1/2020	1/31/2021			
2/1/2021	2/28/2021	4.8		
3/1/2021	5/31/2021			
7/1/2021	8/31/2021	40.8	14	
Total		*52.4*	*17*	*0*

The operational plans laid out in the Cruise Advice Letter fall short of what is required to achieve Commission goals or to avoid discrimination against people who use wheelchairs. The Cruise Advice Letter seeks authority to provide passenger service in the "Cruise AV"; it does not seek authorization for service Cruise hopes to provide in the future using its purpose-built "Origin" vehicle designed and manufactured from the ground up for purposes of providing passenger service to the public without any space dedicated to human driving controls.

While the Cruise Advice Letter identifies some features of the Cruise ride-hailing application and vehicle that will support riders who have visual or auditory disabilities, it illustrates no plans to provide any service at all to people who use wheelchairs either in the Cruise AV itself – or in alternate wheelchair accessible vehicles that may be summoned by use of the Cruise ride-hailing application. It appears that Cruise does not intend to provide equivalent service to people who use wheelchairs in connection with the Cruise Advice Letter. Rather, Cruise states only that it "is exploring a wheelchair accessible version of the Origin." The Cruise Advice Letter illustrates this exploration with an image of a passenger using a folding wheelchair in a vehicle that does not illustrate the key features that would be expected in a vehicle that is designed to be accessible for people who use wheelchairs – such as lifts or ramps and securement systems.

Given the limited record provided by Cruise reports to the Commission and the Cruise Advice Letter itself, we urge Commission staff to seek further information about how Cruise will provide service to the public in a non-discriminatory manner.

IV. Conclusion

In light of the concerns discussed above, San Francisco respectfully recommends that CPED staff further investigate whether the Cruise AV is programmed to comply with state and local law when conducting stops for passenger pick-up and delivery. We further recommend that CPED staff seek input from both DMV staff and San Francisco representatives in this investigation. In addition, we recommend that CPED staff further investigate the equity and disability access concerns raised above.

Finally, if CPED staff is inclined to recommend approval of the Cruise Advice Letter after such investigation, we urge the Commission to limit service to the Initial Operational Design Domain, including both the service area, the number of vehicles (30) and the hours of operation (10pm to 6am) and to require a subsequent Advice Letter for any change to these parameters.

Sincerely,

Jeffrey Tumlin
Director of Transportation

Exhibit A: San Francisco Analysis of Cruise Videos

Exhibit B: San Francisco Suggested Questions re Cruise Stops for Pick up and Drop off of Passengers

Exhibit C: San Francisco Suggested Questions re Cruise Plans for Providing Non-discriminatory Passenger Service

Exhibit A

San Francisco Analysis of Cruise Videos

Cruise LLC posted two videos showing their driverless passenger service testing in San Francisco to YouTube on November 3, 2021. An eight-minute video (Video 1) shows Cruise CTO & Co-Founder Kyle Vogt getting picked up and then dropped off. An eighteen-minute video (Video 2) shows a Cruise vehicle picking up and dropping off passengers six times. For the purposes of this exhibit, each pick up and drop off event is assigned a letter (P for pickup and D for drop off) and a number (1, 2, 3, etc. representing the order of the events in the videos). For example, P2 in Video 2 is the second pickup event in Video 2. (In some places, the Cruise Videos are sped up; thus, the videos reflect longer elapsed driving time.)

Without exception, each pick up and drop off incident happens with the vehicle stopped in a travel lane.

In some instances, footage shows legal curb space on the same blockface or immediately across the street from where the Cruise vehicle stops in a travel lane to pickup or drop off a passenger. In a few instances, a passenger is waiting at a white passenger loading zone; rather than stopping in the loading zone, the Cruise vehicle stops in the travel lane across the street. These instances raise the questions of why the vehicle does not use the legal curb for loading and unloading passengers. The footage implies that the Cruise software does not identify the side of a street from which the passenger seeks service and does not seek to use curbs designated for passenger loading – even when they are immediately available and/or even more proximate to the requesting passenger(s).

Stopping in the travel lane for loading/unloading creates safety hazards and contributes to congestion.

Below are stop by stop descriptions of the pickup and drop-off events in each Cruise video.

Video 1, Posted by Cruise LLC, November 3, 2021[1]

This 8-minute video is composed of footage from several cameras: one exterior to the vehicle, one interior camera looking at the passenger in the back seat, and one looking through the windshield.

The vehicle makes one pickup and one drop off (P1 and D1). The vehicle stops in the travel lane to complete both. For P1, the video shows clearly that there is marked and signed white passenger loading curb available where the passenger is initially waiting, as shown in the screenshot below. Instead of picking the passenger up at the white curb, the vehicle stops in the travel lane and the passenger crosses the street to get into the vehicle. The pickup and drop-off are summarized in Table 1.

[1] https://www.youtube.com/watch?v=dmvZBiWYkFQ

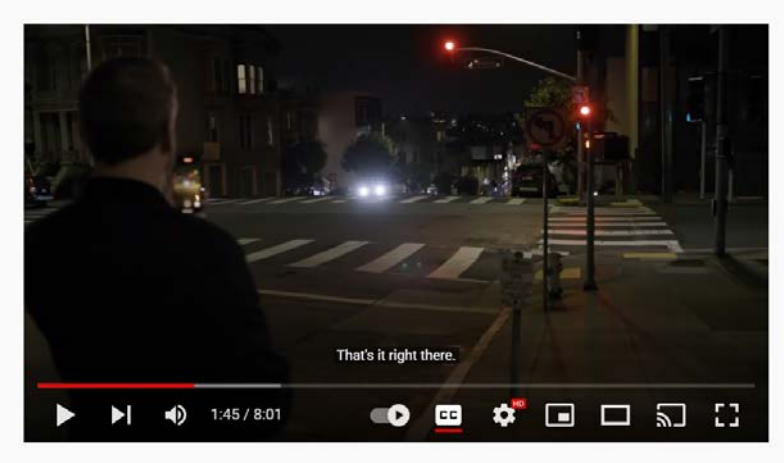


Figure 1. Passenger standing next to white curb awaiting pickup

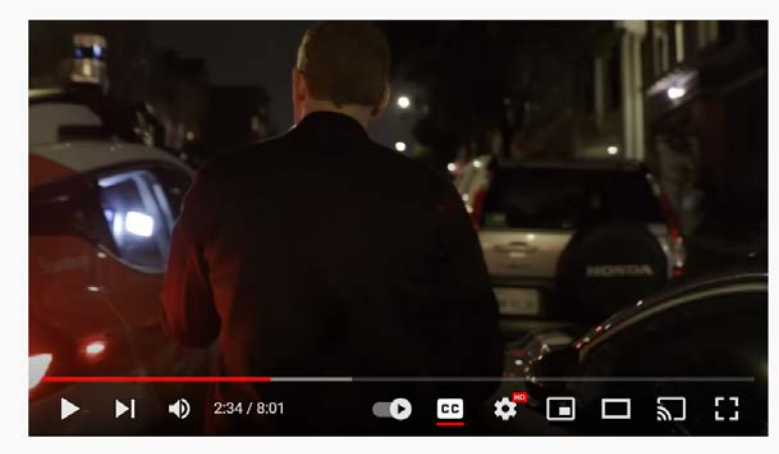


Figure 2. Passenger accessing vehicle stopped in a travel lane for pickup P1

Similarly, at the end of the ride, the vehicle stops in the travel lane to drop the passenger off (D1), as seen in the screenshot below.

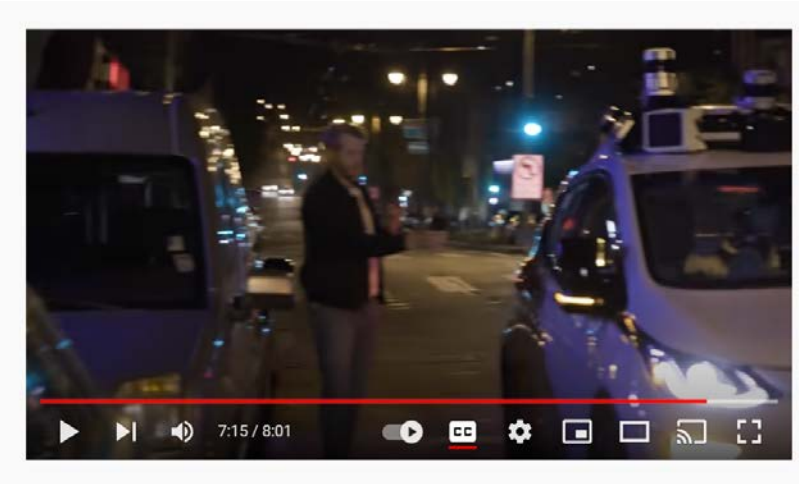


Figure 3. Passenger closing door to vehicle stopped in a travel lane after being dropped off in travel lane (D1).

Table 1. Video 1 Pickups and Drop-offs

Pickup/Drop-off	Time Stamp	Description
P1	2:34	Stops in travel lane to pick up passenger on north side of California between Buchannan and Webster
D1	7:15	Stops in travel lane to drop off passenger at Divisidero between Grove & Hayes

Video 2, Posted by Cruise LLC, November 3, 2021[2]

This 18-minute video shows a composite of footage within the vehicle -looking at the passenger seat and through the windshield- and outside of the vehicle. It also provides a bird's eye view of the vehicle on the street. Video 2 includes six pickup and six drop-off events, as summarized in Table 2. In each event, the vehicle stops in the travel lane to pickup or drop off. At several locations, the footage shows available legal curb space within the block where the pickup or drop-off is taking place. In addition to off-street stopping locations, there may be additional available curb space for passenger pickup and drop-off nearby that is not captured by the video footage (for instance, around a corner).

For P1, the vehicle stops in the travel lane on California Street between Webster and Buchannan. As shown in Figure 4, the passenger had been waiting in front of an unoccupied white passenger loading zone, but the vehicle stops in a travel lane across the street to pick up the passenger.

[2] https://www.youtube.com/watch?v=svebS-uR7wc

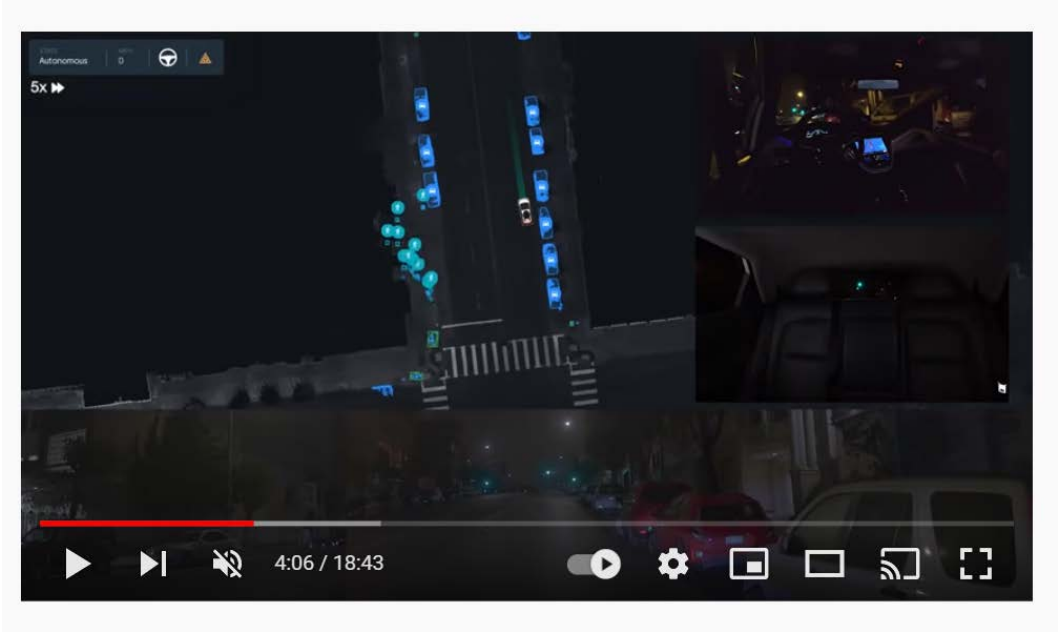


Figure 4. P1, Passenger waiting at white zone, Cruise vehicle stops in the travel lane across street

To drop the passenger off (D1), the vehicle stops in the travel lane as shown in Figure 5.

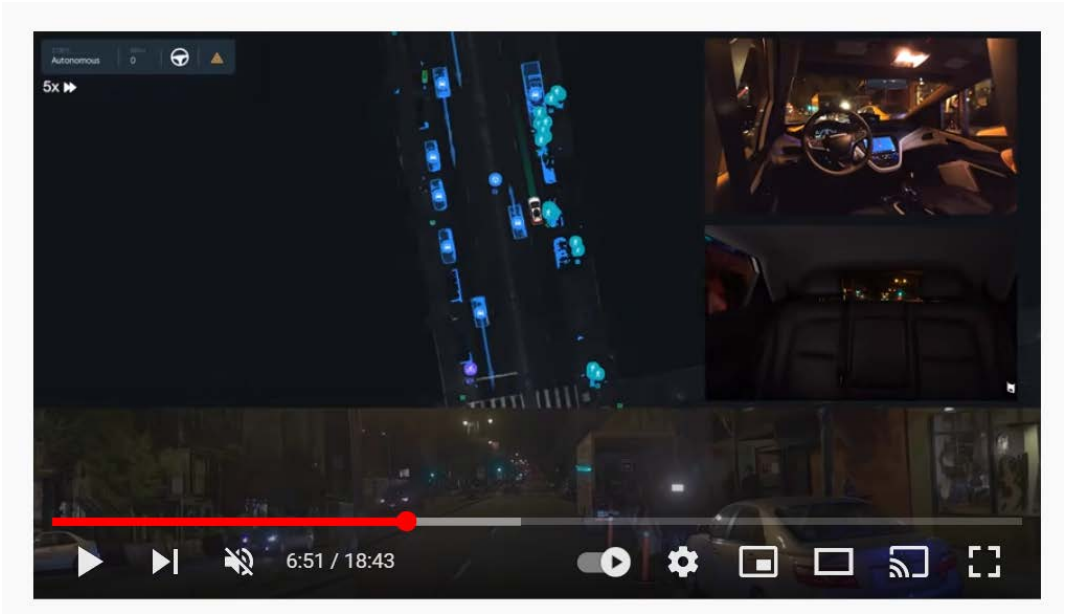


Figure 5. D1, Cruise vehicle stops in a travel lane as passenger alights.

For P2, the Cruise vehicle stops in the travel lane to pick up the passenger.

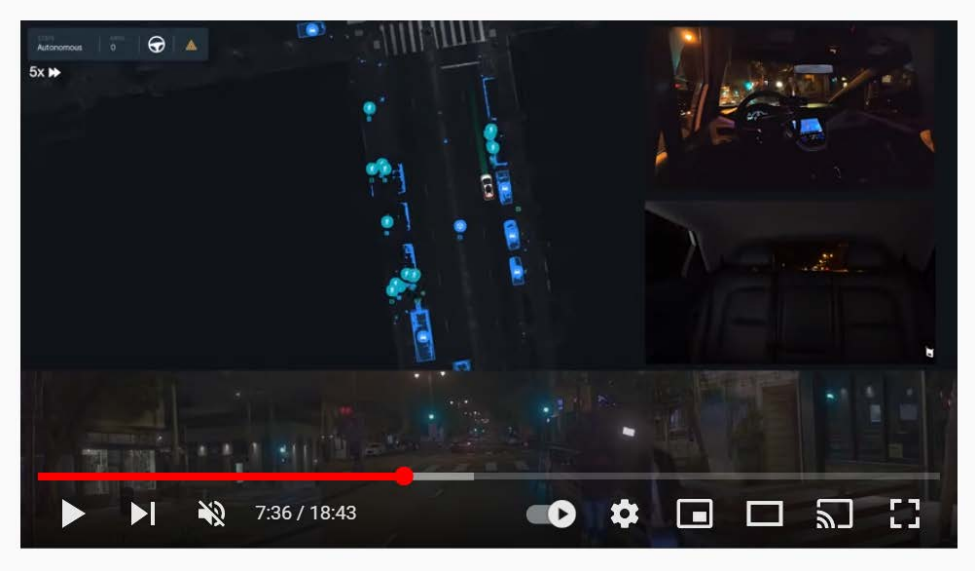


Figure 6. P2, Cruise vehicle stops in the travel lane to pick up passenger.

When the Cruise vehicle drops off the passenger in D2, it stops in the travel lane. Available legal curb space appears both immediately in advance of and immediately beyond the location where the vehicle stops in the travel lane to unload a passenger.

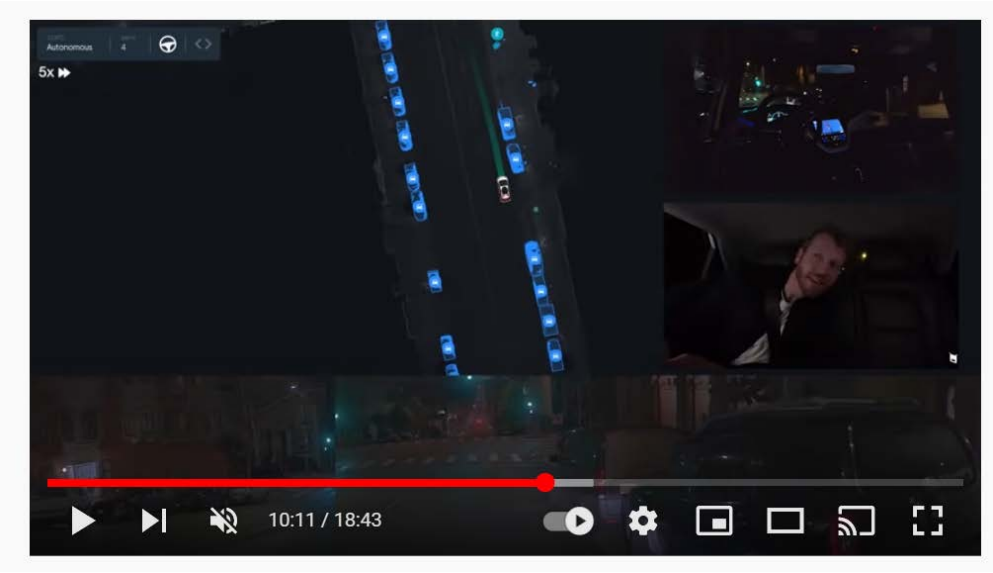


Figure 7. D2, Cruise vehicle stops in a travel lane to drop off passenger

For the third pickup, P3, the vehicle stops in a travel lane. The footage shows that there is an available white passenger loading zone across the street.

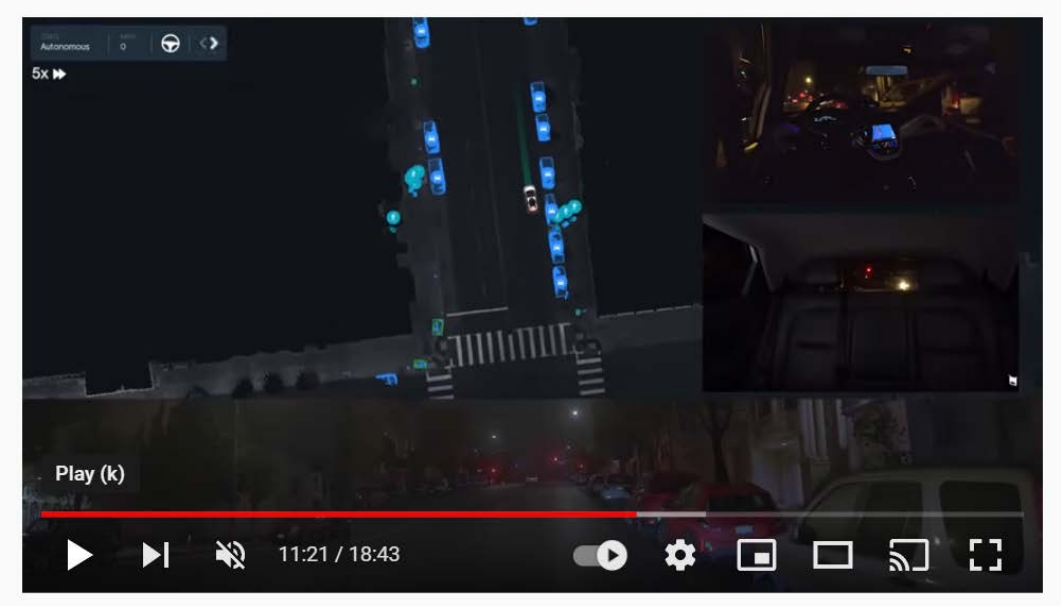


Figure 8. P3, Cruise vehicle stops in a travel lane to pick up a passenger. A white passenger loading zone is unoccupied immediatley across the street.

In D3, shown in Figure 9, the Cruise vehicle stops in the travel lane to drop off a passenger. Pickup P4, shown in Figure 10, happens shortly after in the same location, also while the vehicle is stopped in a travel lane.

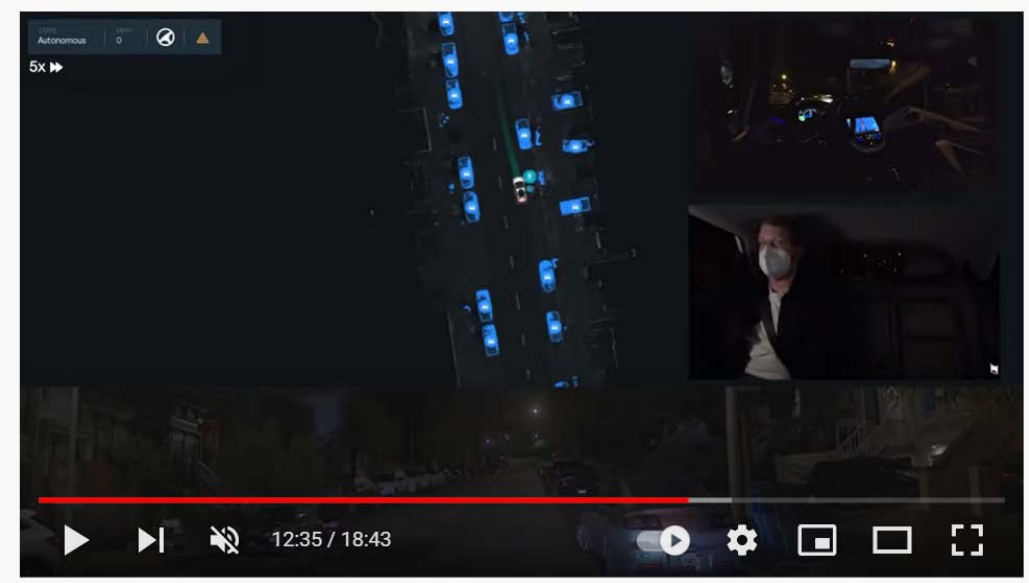


Figure 9. D3, Cruise vehicle stops in a travel lane to drop off a passenger.

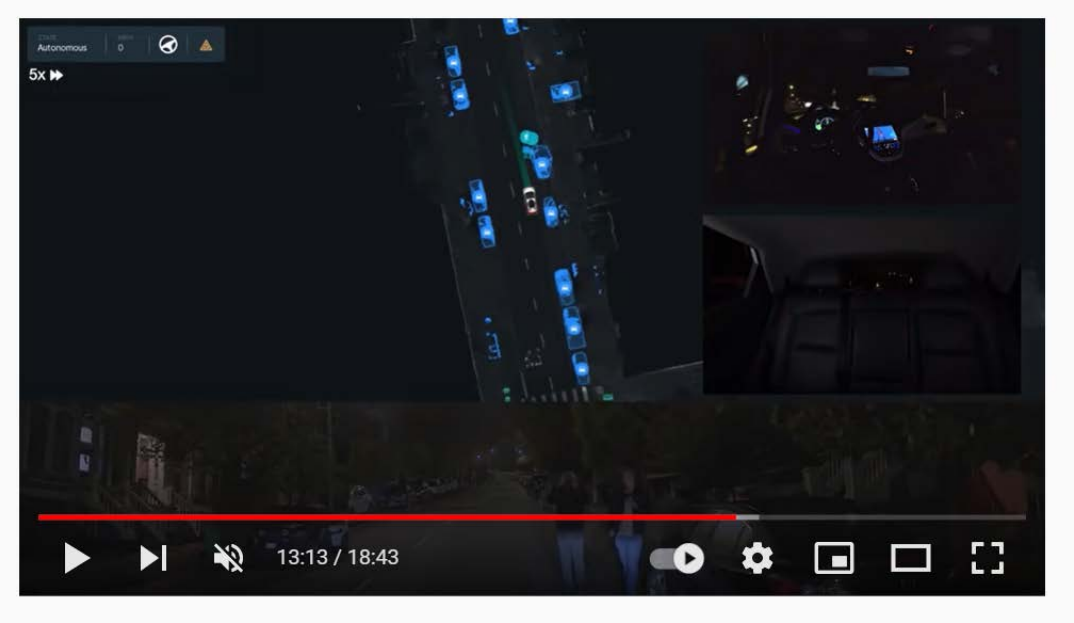


Figure 10. P4, Cruise vehicle stops in a travel lane to pick up a passenger.

D4 drop-off takes place while Cruise vehicle is stopped in a travel lane. As shown in Figure 9, one passenger exits on the driver's side, between the car and the adjacent travel lane and walks behind the vehicle towards the curb.

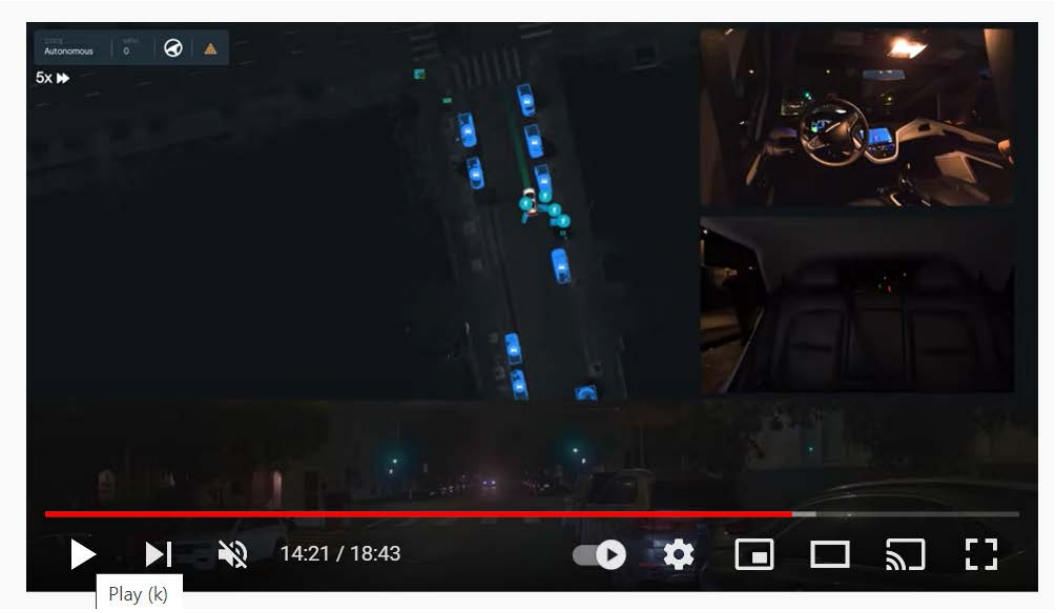


Figure 11. Cruise vehicle stops in the travel lane to unload passengers for D4. The vehicle stopped just past available legal curb spaces.

In P5, the Cruise vehicle stops in a travel lane to pick up passengers.

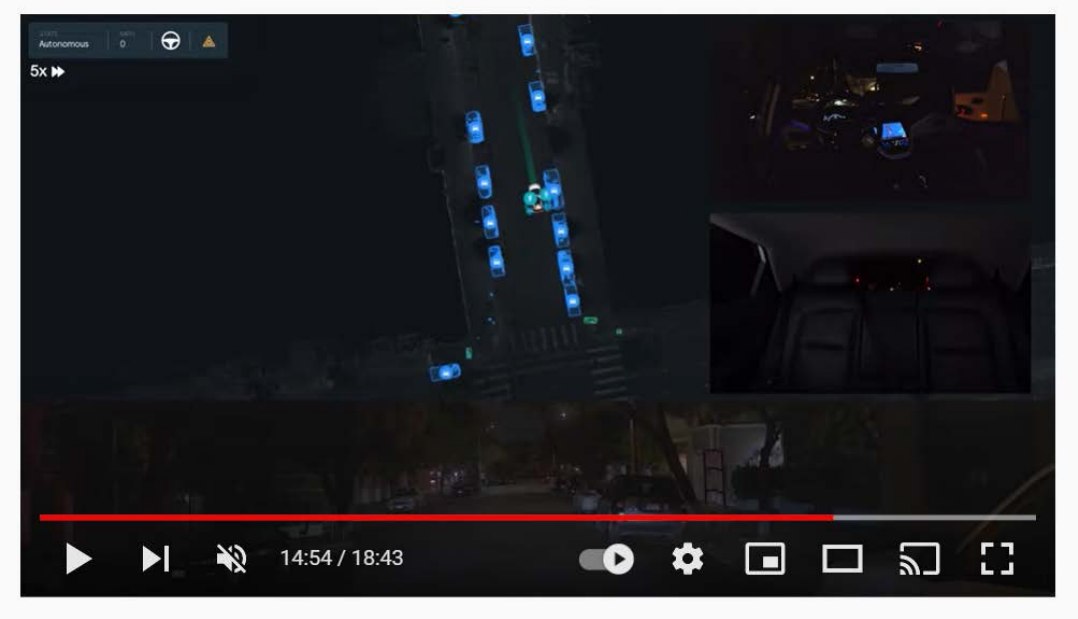


Figure 12. P5, Cruise vehicle stops in a travel lane to pick up. One passenger accesses vehicle by walking between Cruise vehicle and adjacent travel lane.

D5 and P6 take place in the same location. In both instances, which are separated by driving around the neighborhood, the Cruise vehicle stops in a travel lane to drop off and then pick up passengers. In D5 and in P6, one passenger exits from/enters the vehicle on the driver's side, walking between the Cruise vehicle and the adjacent travel lane and then behind the Cruise vehicle to access the curb, as shown in Figures 11 and 12.

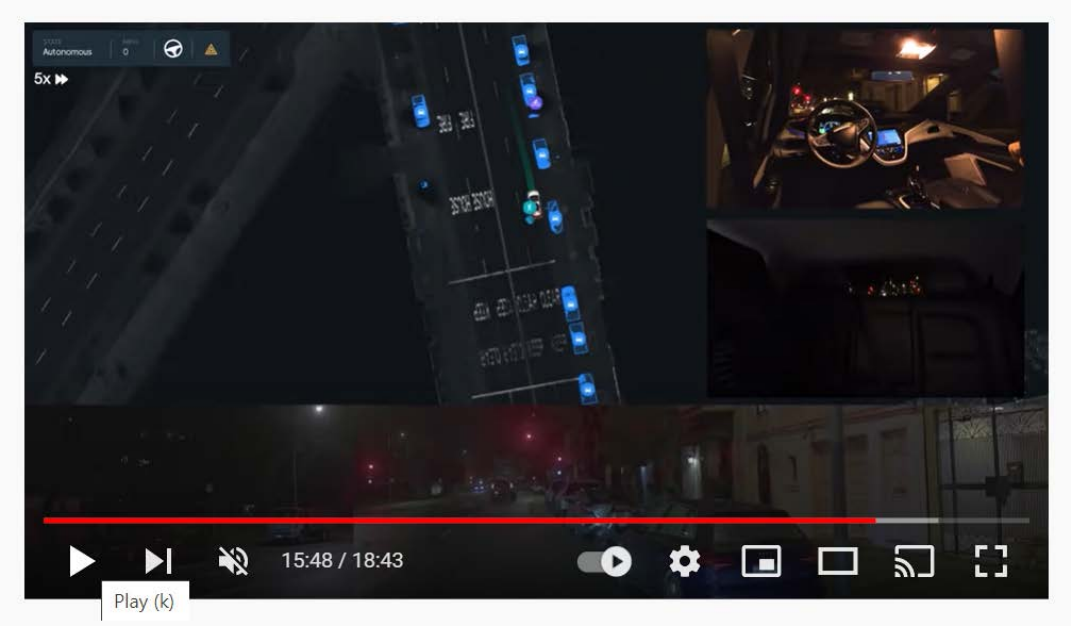


Figure 13. D5 dropping off passengers while stopped in the travel lane. One passenger exits on driver's side into adjacent travel lane.

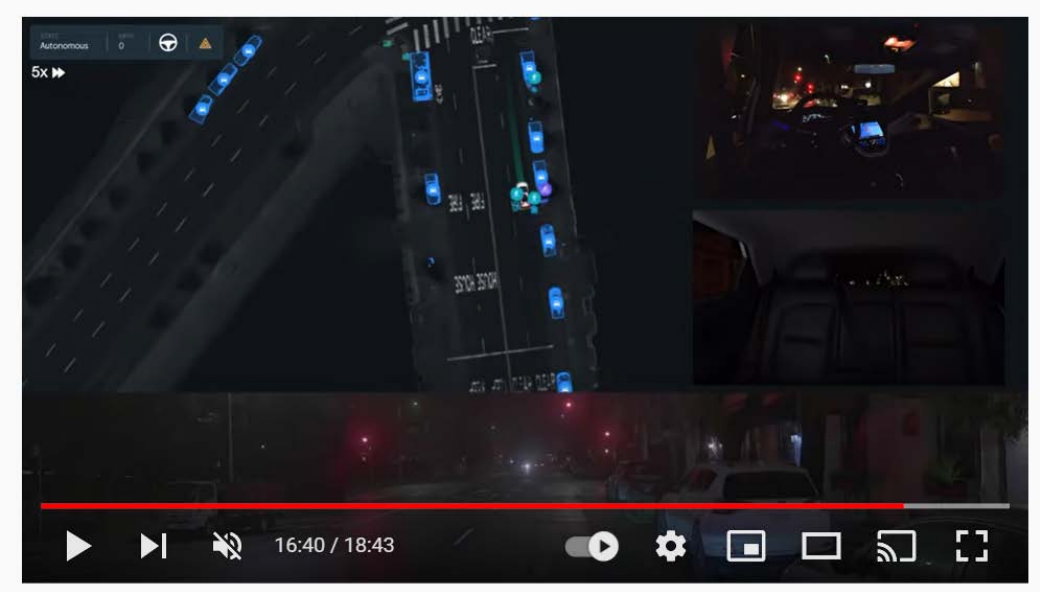


Figure 14. P6, Cruise vehicle stops in the travel lane to load passengers. One passenger accesses the vehicle by walking between Cruise vehicle and adjacent travel lane.

The Cruise vehicle performs the final drop-off, D6, while stopped in a travel lane. As shown in the Figure 10, one of the passengers exits the vehicle on the driver's side of the vehicle, walking between the vehicle and the other travel lane, around the rear of the vehicle in order to access the curb.

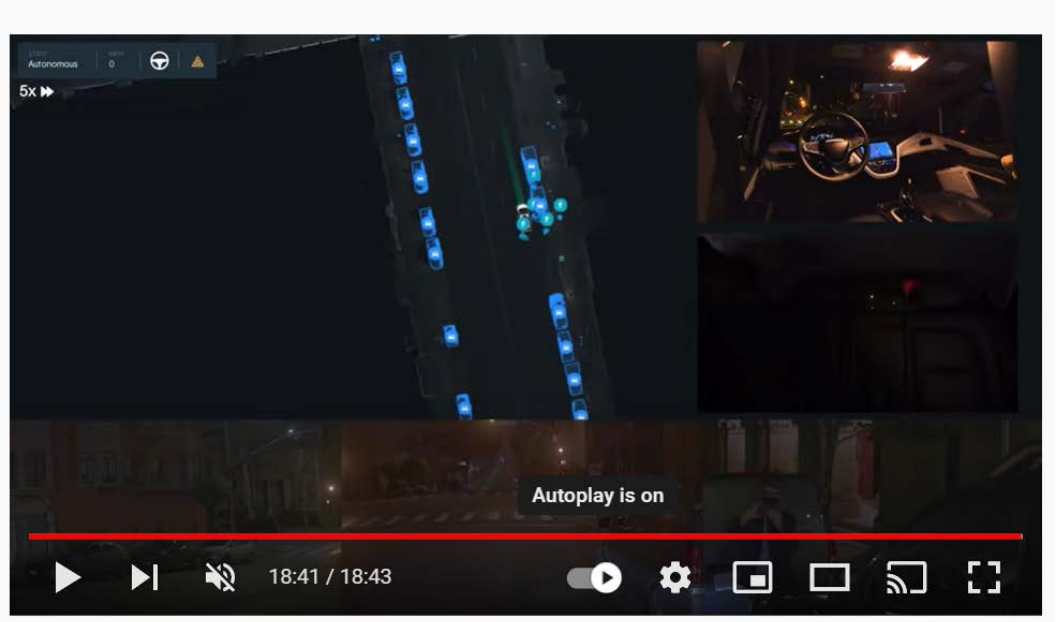


Figure 15. D6, Cruise vehicle stops in the travel lane to drop-off passengers. One passenger is seen walking around rear of vehicle, in travel lane, to exit vehicle.

Table 2 summarizes each of these pickups and drop-offs along with the relevant violations.

Table 2. Video 2 Pickups and Drop-offs

Pickup/Drop-off	Timestamp	Description
P1	4:06-4:24	Stops in travel lane for pick up on California between Webster and Buchannan
D1	6:51	Stops in travel lane for drop off on Divisidero between Hayes and Grove
P2	7:36	Stops in travel lane to pick up at 625 Divisidero, between Grove and Hayes
D2	10:11	Stops in a travel lane to drop off on California between Buchannan and Webster
P3	11:21	Stops in a travel lane to pick up passengers on California between Webster and Buchannan
D3	12:35	Stops in a travel lane to drop off passengers on Sutter between Baker and Lyon
P4	13:13	Stops in a travel lane to pick up at Sutter between Baker and Lyon
D4	14:19	Stops in a travel lane to drop off passengers on Pierce between Pine and Bush
P5	14:54	Stops in a travel lane to pick up passengers on Pierce between Bush and Sutter
D5	15:55	Stops in a travel lane to drop off passengers on Presidio between Bush and Pine
P6	16:38	Stops in a travel lane to pick up passengers on Presidio between Pine and Bush
D6	18:38	Stops in a travel lane to drop off passengers on California between Buchannan and Webster

Exhibit B

San Francisco Suggested Questions re Cruise Stops for Pickup and Drop-off of Passengers

The following are questions that San Francisco urges the California Public Utilities Commission to address to Cruise in consideration of the Cruise Advice Letter request for authority to deploy commercial passenger service in driverless mode.

1. Does the Cruise AV know the curb regulations that are applicable throughout the proposed Initial Service Area? Throughout the City? If so, what is its source of information and how is this information updated? If the information is not updated, why not and what is Cruise's plan to ensure that the vehicles comply with curb regulations?
2. Does the Cruise AV know where available off-street loading space is throughout the proposed Initial Service Area? Throughout the City?
3. In what form does the Cruise ride-hailing application enable a passenger to identify a requested pickup location? By street address? By other landmark?
4. What information does the Cruise AV use to identify whether a requesting passenger has asked to be picked up from a location that is safe and legal for pick up?
5. What expectations does the Cruise AV ride-hailing application communicate to customers about the locations generally appropriate for pickup and drop-off of customers?
6. Where a customer has requested a pickup from an unsafe or unlawful location, does the Cruise AV ride-hailing application communicate alternate safe and legal pickup locations to requesting passengers? If so, with what exceptions?
7. What is the decision tree for the Cruise AV with regard to where to stop to pick up a passenger?
    a. How far from the passenger's requested pickup point or destination will the vehicle pickup or drop off? What are the circumstances for any variation if a range is provided?
    b. What information about the location is used to identify an alternate pickup spot?
    c. What information about a passenger is used to identify an alternate pickup spot?
8. How does the Cruise AV communicate when it is safe for a passenger to exit a Cruise AV?
    a. Does the Cruise AV prevent a passenger from exiting a moving vehicle?
    b. What information does the AV give to a passenger about circumstances around the vehicle that may create hazards (such as other vehicles or bicyclists in the path of a vehicle door)?
    c. Does the Cruise AV prevent a passenger from opening a door into the path of an oncoming cyclist or oncoming vehicular traffic?
9. Does the Cruise AV have the ability to parallel park in a 20-foot parking space (about one car length) that is typical of parking spaces on streets within the Initial Service Area? On streets within the Citywide Service Area?
10. Will the Cruise AV initiate a trip if one or more passengers are not wearing a seatbelt?
11. Does the Cruise AV have the capacity to understand and respond appropriately to direction given by human traffic control officers? Does this depend on guidance from remote advisors? If so, what standards does Cruise have for the response time for communications from remote advisors to the Cruise AV?
12. How has Cruise tested the responsiveness the Cruise AV to lights and sounds of emergency vehicles? Does the Cruise AV recognize and respond appropriately and quickly to these?

Exhibit C

San Francisco Suggested Questions re Cruise plans for providing non-discriminatory passenger service

The following are questions that San Francisco urges the California Public Utilities Commission to address to Cruise in consideration of the Cruise Advice Letter request for authority to deploy commercial passenger service in driverless mode.

1. As to services offered using the Cruise AV, will passengers who cannot transfer from a folding wheelchair (i.e., those who use motorized wheelchairs) be able to make any use of the services? In other words, does Cruise plan to make equivalent service available to wheelchair users in other wheelchair accessible vehicles? What steps will Cruise take to ensure that these services are equivalent?

2. Cruise mentions the use of ioS Voiceover to provide service to people with visual disabilities in the Cruise AV. Will the Cruise ride-hailing application be usable by blind people who use non-ios devices? How will Cruise services be available to people who have both a visual disability and an auditory disability?

3. As to services offered using the future purpose-built Origin vehicle,

    a. when will a fully accessible wheelchair accessible version of the Origin be available?
    b. how will passengers communicate a need for a wheelchair accessible vehicle?
    c. how will users of motorized wheelchairs enter and exit and how will wheelchairs be secured while the vehicle?
    d. How will passengers needing a wheelchair accessible vehicle be directed to an accessible location for loading or unloading?