

**From:** [Zenk, Jessica](#)  
**To:** [Downtown West Project](#)  
**Subject:** FW: Access Analysis  
**Date:** Saturday, May 15, 2021 7:19:28 AM  
**Attachments:** [20210511\\_SAP\\_Access\\_Analysis.pdf](#)

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**From:** Franziska Church <f.church@fehrandpeers.com>  
**Sent:** Tuesday, May 11, 2021 11:37 AM  
**To:** Banwait, Manjit <Manjit.Banwait@sanjoseca.gov>; Lapustea, Florin <Florin.Lapustea@sanjoseca.gov>  
**Cc:** Zenk, Jessica <Jessica.Zenk@sanjoseca.gov>  
**Subject:** Access Analysis

[External Email]

Admin Draft – For internal discussion

Hi Manjit and Florin,

Attached please find our memo addressing the access analysis. Please let me know if you have any questions or would like to set up a time to discuss.

Thank you,

**Franziska Church, AICP**  
Principal  
Fehr & Peers Transportation Consultants  
408.645.7014

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# Admin Draft

# Memorandum

Date: May 11, 2021

To: Jessica Zenk and Manjit Banwait, City of San José

From: Franziska Church, Carmen Kwan, and Eric Womeldorff, Fehr & Peers

Subject: **Supplemental Analysis for the Downtown West Mixed-Use Project – SAP Center Access Analyses**

*SJ19-1951*

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## Introduction

This memo provides supplemental information about the potential experience of SAP Center event attendees who travel in vehicles after completion of the Downtown West Mixed-Use (“Downtown West”) project. This memo provides evidence in response to the central question: “can the future roadway network accommodate activity from Downtown West and typical vehicle traffic associated with pre- and post-events at the SAP Center?” This question has been the focus of several meetings among parties invested in the continued success of the SAP Center in the context of the proposed Downtown West project: the City of San José, Sharks Sports & Entertainment (SSE) group, and the Downtown West project sponsor. To address the central question of whether the future roadway network could accommodate activity from Downtown West and SAP events, this memo includes three sections:

- **Ingress Analysis:** Simulation analyses of conditions: 1) before an event (“ingress”) at SAP Center; and 2) the same time without an event. These analyses were developed by Fehr & Peers in March/April 2021. Comparisons of model results shows that travel times along primary routes from freeway exits to SAP Center parking locations could increase by approximately one to seven minutes in the hour before an event as compared to when



- there are no events, depending on the route. The methodology and model inputs and outputs of the analyses are described herein.
- **Peer-Review of SSE Ingress Analysis:** Fehr & Peers' peer review of an ingress analysis focused along Autumn Parkway developed by Krupka Consulting for Sharks Sports & Entertainment (SSE) group in February 2021. The analysis uses different methods, inputs, analysis software, and interpretations of industry practices than the Fehr & Peers analysis.
  - **Egress Analysis:** A simulation analysis of conditions following an event ("egress") at SAP Center. This analysis was developed by Nelson Nygaard in 2020. The analysis shows that approximately 90 percent of post-event egress traffic could exit parking locations within a 1/3 of a mile of the SAP Center containing 5,733 parking spaces in 45 minutes following the end of an event at SAP Center. Approximately 70 percent of post-event egress traffic could exit in 30 minutes following the end of an event at SAP Center. Fehr & Peers undertook a peer review of this analysis in December 2020 and has confirmed the findings. Both the analysis and peer review have concluded that egress volumes and times are in line with comparable urban venues.

For the purposes of all analyses described above, all SAP Center attendees are assumed to be for a San José Sharks hockey game.

This memo was developed for informational purposes and presents analysis not required by CEQA. The project approvals to be considered by the San Jose City Council are not contingent upon this analysis or discussions between the City of San José, SSE, and the Downtown West project sponsor.

## Analysis Context

The area in the core of Downtown West, especially around Diridon Station and the SAP Center, is surrounded by surface parking lots that would be redeveloped by the project. The City of San José, through their long-range vision identified in Envision 2040 and the Diridon Station Area Plan ("DSAP"), seek to transform the area around Diridon Station and SAP Center into a dense, vibrant area with access that is balanced for all users, including pedestrians, bicyclists, transit riders, and cars. With this vision comes increased activity, including increased levels of foot, bike, transit, and car traffic, that are representative of a vibrant downtown. SSE is an essential partner in creating the City's vision and the City seeks to work with SSE to embrace the change in character around Downtown West, while balancing the needs for visitors and residents of San José alike.

With the added development proposed by Downtown West, that there will be more people working and living in close proximity to SAP Center that can take advantage of transit, bicycle, and pedestrian investments to easily access SAP Center without the need to drive. However, the City does recognize that vehicular access is an important aspect of attending events at SAP Center, and through its commitments in the Arena Management Agreement (AMA) will continue to provide, and exceed, access to approximately 5,125 parking spaces within a 1/3 of mile of the



arena. While the analyses presented in this memo focus on analysis of vehicular access; access by foot, bike, and transit will play a key role to the area's future success.

## Parking Context

The amount and location of parking spaces for SAP Center event attendees will change with the development of Downtown West. As noted in the Analysis Context section, the City has committed to SSE through an Arena Management Agreement (AMA) the AMA that 5,125 parking spaces for SAP Center event attendees will be available within a 1/3 of a mile of the arena, consisting of 1,650 "on-site" parking spaces located in lots A-D, 300 employee parking spaces, and 3,175 parking spaces to be provided within 1/3 of a mile of the arena. The City currently meets the AMA parking agreement through a distribution of parking across approximately 30 lots, including lots A,B,C, as well as on-street parking. As described in the Diridon Station Area Plan Update (October 2020) the City is committed to "ensure the continued vitality of the SAP Center, recognizing that it is a major anchor for both Downtown San José and the Diridon Station area, and pursue best efforts to maintain a sufficient supply of parking and efficient vehicular and pedestrian access for SAP Center customers, compliant with the standards set forth in the Arena Management Agreement." To date, and moving forward, the City will continue to take a district approach to meeting the requirements outlined in the AMA which includes prioritizing shared and dispersed parking through a right-sized parking approach.

With the build-out of the Downtown West Project, the SAP Center will have access to more parking spaces than they do today as outlined by the AMA. Downtown West's parking requirements as described in Exhibit K of the Development Agreement are intended to ensure sufficient parking is publicly available within the project site and available for SAP Center use. The Downtown West Project is committed to the replacement of approximately 2,850 publicly accessible spaces that currently exist on the project site and may provide up to 4,800 spaces within the project area at build out.

**Inset 1** below shows a potential parking distribution at full build-out of the Downtown West project and shows how a combination of parking within the Downtown West Project, coupled with parking from existing sites, new parking lots<sup>1</sup>, and on-street parking within a 1/3 of a mile continues to meet, and exceed, AMA requirements. The analysis also uses a more conservative scenario that distributes additional parking in the area immediately surrounding the SAP Center than exists today in response to SSE preferences.

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<sup>1</sup> This analysis analyzed parking across the 1/3 of a mile in addition to parking located within the Downtown West project. The parking scenario analyzed included an option currently under discussion with the City to develop a group of parcels just north of the SAP Center as a parking lot known as "Lot E." The completion and timing of Lot E has not been established and is not guaranteed but was assumed to provide approximately 1,020 spaces for the purposes of this analysis.



*Inset 1. Illustrative diagram showing potential parking distribution option*

Source: Google, 2021

Together, this parking distribution shows how the AMA parking requirement can be exceeded, allowing for an additional 350 spaces above the 5,125 required to be available for SAP Center use. Additionally, at the specific request of SSE, this scenario excludes any parking for SAP center events on the 1,000+ Adobe parking structure (labeled “Adobe”). This lot is within the 1/3 of a mile radius and meets AMA requirements and could therefore add an additional approximate 850 spaces, well above the AMA requirement<sup>2</sup>.

While every comparable arena operates in distinct environments, the result of the AMA and proposed parking is that the SAP Center will continue to be provided with approximately one parking space within a half-mile per every two venue seats, which is more parking spaces than other arenas in the Bay Area despite the changing nature of the area and addition of options to access it by foot, bike, and transit in the future.

Since the amount and location of parking for SAP Center event attendees has been a part of negotiations between City of San José staff, SSE and the Downtown West project sponsor with

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<sup>2</sup> Parking spaces total assumes 85 percent availability for parking within Downtown West and Lot E and does not assume any parking within the Adobe property; however, the addition of parking within the Adobe property would add approximately 850 parking spaces based on an assumption of 85 percent availability. The supply of existing parking locations were based on a 2017 survey of parking occupancy within 1/3 mile of the arena.



conversations starting in 2019, the number of parking spaces included in the Ingress (5,450) and Egress (5,700) analyses (as described in forthcoming sections) are slightly different than the final proposal included in Exhibit K. In particular, the Egress analysis assumes approximately 2,580 more vehicles parking than in the Ingress analysis. Given that this exceeds the existing and proposed parking counts, and represents more vehicles trying to leave the SAP Center area following an event, the egress analysis is conservative; as the increased parking assumption equates to more people leaving and longer travel times.



# Fehr & Peers Ingress Analysis

Fehr & Peers participated in meetings with City of San José staff, SSE, Krupka Consulting, and the Downtown West project sponsor to discuss potential approaches in response to the central question: “can the future roadway network accommodate activity from Downtown West and typical vehicle traffic associated with pre-and post-events at the SAP Center?” During those meetings we heard SSE’s top concern is maintaining convenient vehicular access for attendees, as measured by effects on vehicular delay and increases in travel time, with a specific focus on Autumn Street between Santa Clara Street and Park Avenue. SSE expressed their desire for the attendee experience for those traveling in vehicles to be the same as historical norms following the development of the Downtown West project. City staff expressed a desire for the approach to create access for more people, as conveniently as possible, as travel expectations evolve during development of the Downtown West project. It could best be summed up as trying to achieve a balance in access (to SAP Center and the adjacent area), travel modes, and travel times for event attendees.

Following the meetings described above and in further consultation with City staff, we proposed to develop a SimTraffic<sup>3</sup> model to forecast the Background plus Downtown West plus SAP Center Event attendee arrival scenario (as defined in the following section) to address the central question as well as SSE concerns about potential changes to the experience of SAP Center event attendees who travel in vehicles. The ingress model would allow us to speak to the future network’s ability to accommodate traffic and report/assess vehicle travel times, which can also be used as a proxy for vehicular delay, particularly at intersections of concern<sup>4</sup>. City staff concurred with this approach, with the stipulation that the results be shared with all parties where the central question was discussed.

Concurrently, we also developed a scenario in which the same time of day is modeled, but no event occurs at SAP Center; a “typical weekday”. The purpose of this additional model was to compare the travel time results of each scenario to determine the magnitude of route travel time differences between the two. SimTraffic is an appropriate model platform for an exercise centered on vehicle travel times because it simulates all the vehicles on a roadway individually, and accounts for the interactions between vehicles that could cause queuing or have an effect on

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<sup>3</sup> SimTraffic is not used by the City to identify LOS adverse effects per Council Policy 5-1; when LOS analysis is required for adverse effects determination, the City applies TRAFFIX software, which is a macro simulation tool that uses HCM methodology.

<sup>4</sup> SSE requested that LOS analysis occur, but since the study area is within the Downtown Core there are no established LOS thresholds per Council Policy 5-3



vehicle speeds and traffic control, like stop signs and traffic signals. Its main inputs are traffic volumes, roadway / intersection geometries, and intersection control.

The ingress and typical weekday models build upon the traffic volume and roadway network prepared for Downtown West's Local Transportation Analysis (LTA).

## Methodology

The following sections describe the main model inputs, data sources, and key assumptions made during development.

### Traffic Volumes

The ingress model traffic volumes are composed of the following, which are described in more detail below:

1. Traffic volumes that account for Downtown West project-generated vehicles (taken from Downtown West's LTA),
2. Adjustments to account for the weekday 6:30 to 7:30 PM analysis time period,
3. Adjustments to account for background traveler behavior leading up to an arena event,
4. Accounting for Arena attendees arriving in personal vehicles, and
5. Adding vehicles to account for Uber/Lyft.

Figures showing detailed intersection traffic volumes are available in the **Appendix A**.

#### *(1) LTA Background Plus Project Traffic Volumes*

The starting point for both the ingress traffic volumes are the PM peak hour traffic volumes from the Background Plus Project Buildout scenario (LTA Scenario 2c),<sup>5</sup> modified to account for the full Transportation Demand Management (TDM) commitment required by mitigation measure AQ-2h, *Enhanced Transportation Demand Management Program*.

The "Background No Project" volumes (to which Downtown West-generated vehicles are added) represent "existing" volumes plus vehicles generated by "approved but not yet built" and "not occupied" developments in the area per the City's Approved Trip Inventory (ATI). The existing volumes and trips from the City's ATI do not account for any shifts from non-single occupancy vehicles (non-SOV) that would occur in the project area with the planned investments in pedestrian, bicycle, and transit infrastructure and services by DTW, the City, Caltrain, and BART. Ultimately, the project area would need to achieve a 75 percent non-SOV mode split to reach the City's full vision of *Envision San José*. Since the "approved but not yet built" developments

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<sup>5</sup> The PM peak hour intersection analysis presented in the LTA accounts for an approximately 18 percent trip reduction due a basic TDM program and does not include the additional nine percentage points required by the EIR TDM mitigation measure.





volumes do not include shifts to non-SOV anticipated in the area, it stands that the Background No Project traffic volumes used in this analysis could be comparatively higher than is expected by the City, leading to a conservative analysis input.

### *(2) Time shift from PM Peak Hour to 6:30–7:30 PM*

The traffic volumes were then adjusted to account for the time period shift from the PM peak hour (an hour between 4:00 – 6:00 PM) to the 6:30 – 7:30 PM time period. This time period was chosen because SSE indicated that historically, most event attendees arrive about one hour prior to a typical game start time, which currently typically start at 7:30 PM. The adjustment factor was developed based on a comparison of freeway ramp traffic volume reports—those collected as part of the project and those from the Caltrans Performance Measurement System (PeMS) traffic count database. The comparison resulted in an estimate that traffic volumes during the typical weekday 6:30–7:30 PM period are approximately 80 percent of typical weekday PM peak hour traffic volumes. A similar time period shift was done as part of the DSAP Traffic Impact Analysis in 2013. As included in that report on page 68, “a comparison of existing traffic volumes at study intersections indicated that on average traffic volumes in the 6:00–7:00 PM period are 70 percent of those during the standard PM peak hour.” Since a 70 percent reduction in traffic volumes leads to a larger reduction than 80 percent, the traffic volumes used in this analysis could be comparatively higher than was projected by an earlier City-led report, leading to a conservative analysis input.

### *(3) Traveler Behavior Adjustments to Traffic Volumes*

An additional adjustment was made to traffic volumes to reflect our observations in other urban locations (e.g., Sacramento, San Francisco, Seattle, and Los Angeles,) where Fehr & Peers have engaged in the planning and arrival experiences of arenas.<sup>6</sup> In these locations, “background” traffic during the pre-event arrival time is typically altered on days with an event as 1) some people that work near arenas proactively alter their commute routines on event days, leaving work early and/or working from home on those days to avoid additional commute travel time, and 2) people that would have typically traveled through the area surrounding the arena but choose to alter their route, change their time or mode of travel, or choose not to travel due to awareness of an event.

In general, one can think of the “value” of vehicle trips along a spectrum from low to high. As traffic conditions become more congested, “higher” value trips will displace some of the “lower” value trips, who may choose a different route, mode, time, or even whether to travel. More specific to the “pre-event” ingress scenario, event attendees represent some of the highest value

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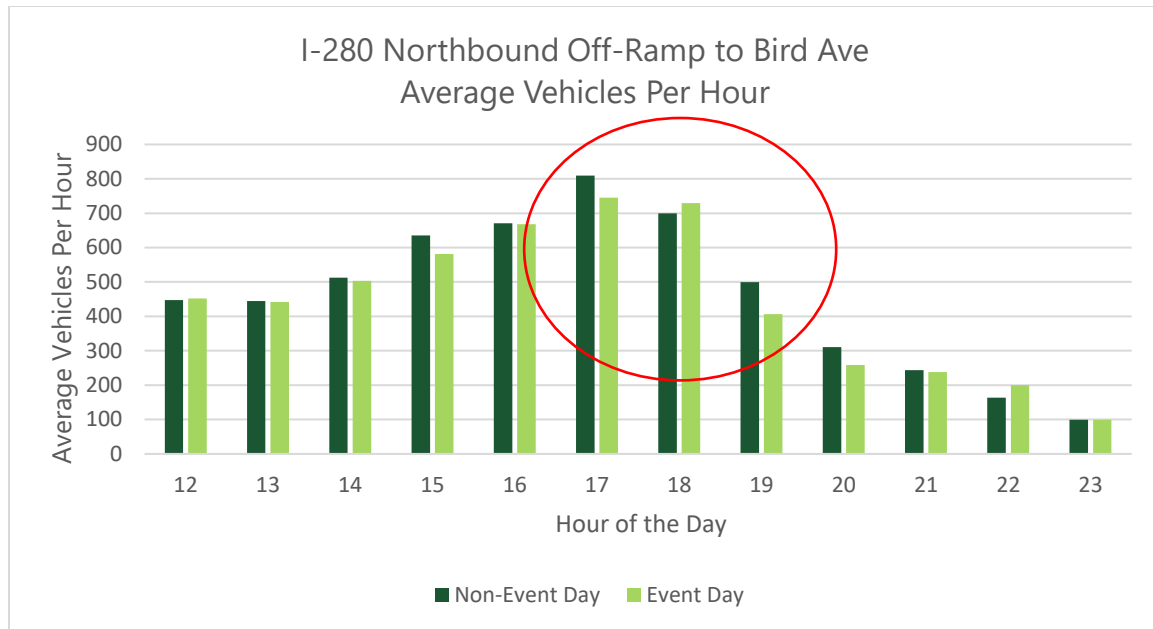
<sup>6</sup> Fehr & Peers has engaged in several recent transportation studies where the planning of NBA/NHL arenas and the arrival experience have been the focus: the Golden One Center in Sacramento, CA, the Chase Center in San Francisco, CA, the Climate Pledge Arena in Seattle, WA, and the proposed LA Clippers Arena in Inglewood, CA.



trips on the transportation network; not only have they chosen to travel but the success of their trip (and their investment in the evening as represented by purchasing tickets and attending an event at SAP Center) hinges on their arrival during a certain period (i.e., before the event begins). These people must travel during a certain time and to a certain location, whereas others can alter their route, time, or mode of travel, or choose not to travel. In the case of commuters that typically travel in their vehicles, changing the start time of their commute back home on days where there is an event can lead to a more predictable and consistent commute experience.

In order to approximate the current size of the effect in which background traffic is altered on days in which there are events, available freeway ramp data was collected from the PeMS traffic count database on 6 weekday evenings with a San José Sharks game at SAP center and 15 days without a home game at the SAP center in the October to December 2019 timeframe. Data was only available for the I-280 on and off-ramps at Bird Avenue – no ramp data was available for SR 87 off-ramps at Santa Clara or Julian Street.

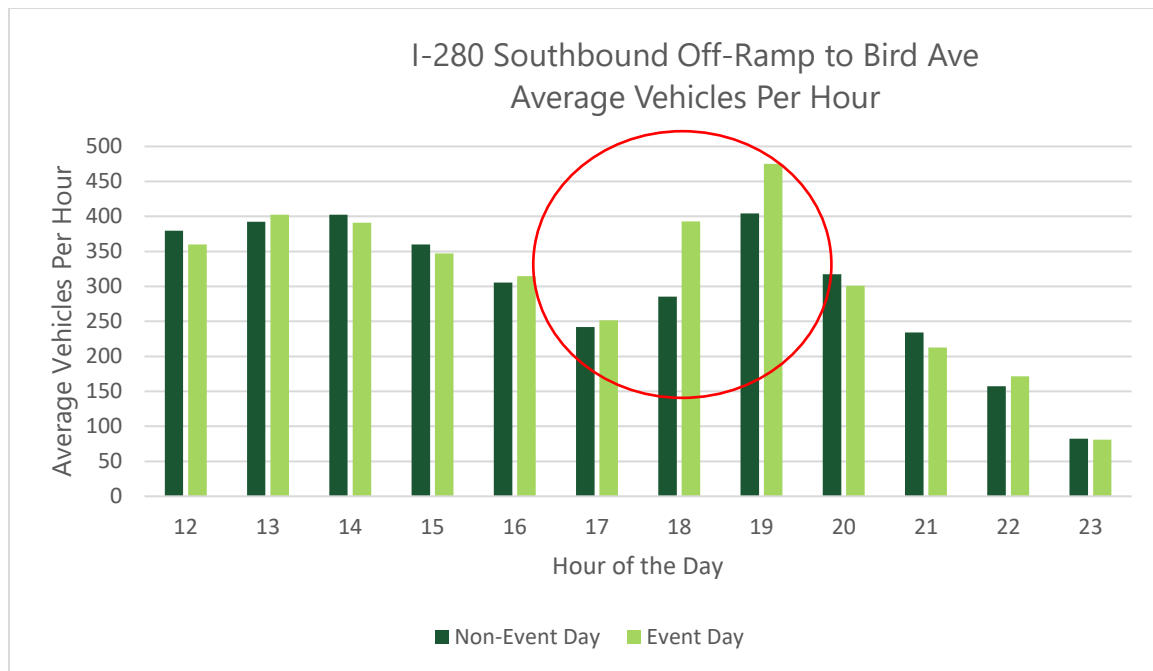
As shown in the red circle in **Inset 2**, the I-280 northbound off-ramp to Bird Avenue shows that during the 5:00 – 6:00 PM hour before an event, the off-ramp volumes decreased by 8 percent compared to a typical weekday. This could illustrate the phenomenon in which drivers who are aware of the event take steps to avoid the Downtown West area. In the 6:00 – 7:00 PM hour there is a 4 percent increase in off-ramp volumes on a game day compared to a typical weekday representing people arriving to the downtown event, less than the expected increase if one were to assume SAP ingress traffic were added to background traffic with no changes. In the 7:00 – 8:00 PM hour, there is an 18 percent decrease in off-ramp volumes during an event day, which again could show that some drivers take steps to avoid the Downtown West area during the window of events at SAP Center.



*Inset 2. I-280 Northbound Off-Ramp to Bird Ave Average Vehicles Per Hour*

Source: Caltrans PeMS traffic count database, Fehr & Peers, 2021

As shown in **Inset 3**, the I-280 southbound off-ramp to Bird Avenue generally shows an increase in ramp volumes on days with an event at SAP Center in the hours preceding it. Further, the red circle indicates that from 5:00 – 6:00 PM, there is an approximate four percent increase in ramp volumes. From 6:00 – 7:00 PM there is a 38 percent increase (from 285 to 393 vehicles) in ramp volumes, and from 7:00 – 8:00 PM there is an 18 percent increase (from 404 to 475 vehicles) in volumes on a game day compared to a typical weekday. However, like the northbound off-ramp to Bird Avenue, we would expect the increase in vehicles to be much larger if arena ingress traffic were simply added to “non-event” traffic with no underlying changes in traveler behavior. In the case of the northbound off-ramp, based on arena ingress information provided by SSE (number of attendees arriving by vehicle prior to an event and by which routes, as described in the Ingress Trip Assignment section) we would expect the increase to be in the range of 500 – 1,000 vehicles. Not only was the typical increase of approximately 110 vehicles between 5:00 – 6:00 PM and 70 vehicles between 6:00 – 7:00 PM comparatively less than this range, the average vehicles per hour inclusive of background traffic and arena attendees arriving by vehicle at this location (approximately 390 vehicles between 5:00 – 6:00 PM and 480 vehicles between 6:00 – 7:00 PM) were themselves less than the potential range of increase in vehicles. Due to these gaps between projections and measured data, it is a reasonable takeaway that some drivers take steps to avoid the Downtown West area during the window of events at SAP Center.



*Inset 3. I-280 Southbound Off-Ramp to Bird Ave Average Vehicles Per Hour*

Source: Caltrans PeMS traffic count database, Fehr & Peers, 2021

It is a reasonable conclusion that the fact that travel times from freeway off-ramps to parking locations are functionally the same when there is and when there is not an event at SAP Center is evidence that some drivers take steps to avoid the Downtown West area during the window of events at SAP Center. If there was no change in travel behavior, and SAP Center attendees were simply added to the “normal” amount of traffic on Downtown West area roadways, travel times would increase more than they are observed to.

It is challenging to predict how large the future effect of the following could be: 1) people that work near arenas who would proactively alter their commute routines on event days (i.e., leaving work early and/or working from home) to avoid additional commute travel time, and 2) people that would have typically traveled through the area surrounding the arena but choose to alter their route, change their time or mode of travel, or choose not to travel due to awareness of an event. Through our examination of the Bird Avenue off-ramps, one of several off-ramps used by arena attendees arriving in vehicles, we have shown that there likely have been measured effects from these factors as recently as 2019. Further, our comparison of travel times along key routes provides further evidence of these effects. It is reasonable to presume that as the Downtown West project is built out over time, this effect could become more pronounced as we have observed in other urban locations with arenas. Thus, for the purposes of the ingress analysis we selected a reduction of 25 percent of background traffic, even though we believe the effect may be greater.



#### *(4) Arena Attendee Volumes*

The arena attendee traffic volumes assumed 60 percent of all attendees would arrive in the hour prior to an event start time. This assumption comes from using the average of survey-reported percentages of typical attendee arrivals in the hour before NBA game start times in arenas located in Sacramento (55 percent, reported in 2017), San Francisco (50 percent, reported in 2019), and Los Angeles (70 percent, reported in 2018). The remainder of attendees could arrive before the hour prior to start to participate in pre-game activities and/or patronize restaurant/bars; the type of behavior seen today in San Jose prior to games including in the San Pedro Square area. Further, although the three arenas reported lower percentages of attendees arriving by personal or Uber/Lyft rideshare vehicles (reported between 50 and 85 percent) than SSE did for those attending San Jose Sharks games (90 percent), we retained the higher vehicle arrival percentage for our analysis, despite the potential for increased non-vehicle arrival modes due to the increase in residents and commercial opportunities within a five-minute walk of SAP Center.

#### *(5) Uber/Lyft Rideshare Volumes*

Additionally, the ingress model includes 200 Uber/Lyft rideshare vehicles containing approximately 500 arena event attendees; these attendees are dropped off at the existing Autumn Street Drop Off Area.<sup>7</sup>

### **Ingress Trip Assignment**

The arena attendee vehicle trips were assigned to the roadway network consistent with the "Approach Routes to SAP Center Based on Zip Codes for Sharks Season Ticket Holders," December 30, 2017 and "Ingress Routes Diridon Area Plan," June 2020 provided by SSE in March 2021. Lacking detailed information about where individual attendees typically park, attendees were assigned to the 16 parking locations within 1/3 mile of the SAP Center, comprising approximately 5,450 parking spaces (as shown in **Inset 1**) proportional to their available capacity. These parking spaces are targeted to be 85 percent available for SAP Center attendee use at 6:30 PM. Thus, in a conservative assumption (i.e., could lead to higher vehicle travel times) each parking location was assumed to have a similar proportion of vehicle trips from each major attendee origin point (e.g., from north on Highway 101, from south on Highway 87, etc.) rather than attendees favoring parking locations closest to their origin point.

### **Roadway Network**

The typical weekday roadway network is the same as that used for the LTA weekday PM peak hour scenario and includes future planned projects such as closing Montgomery Street south of

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<sup>7</sup> <http://www.sapcenter.com/guest-services/guestpickupdropoff>



San Fernando Street and converting Autumn Street from one-way today to two-way in the future. The ingress model network was further modified for two assumed event traffic management strategies: (1) the closure of Autumn Street in front of the SAP Center between Santa Clara Street and St. John Street, and (2) the use of dynamic lanes on Autumn Street such that there are two southbound lanes between Santa Clara Street and Post Street, and two northbound lanes between the light rail crossing north of San Fernando Street and Post Street.

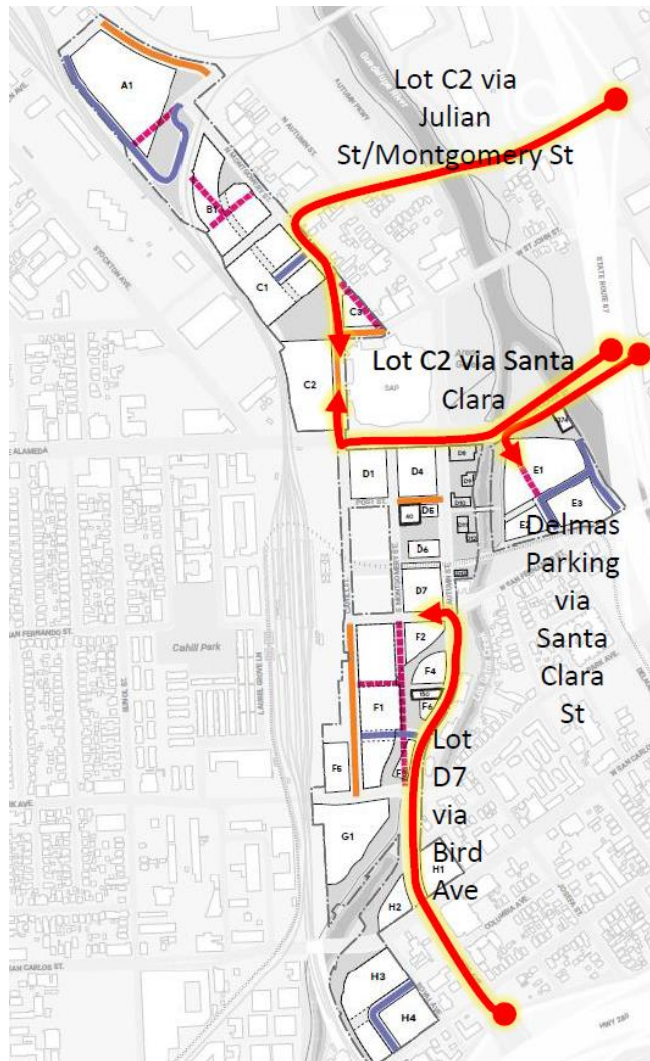
## Ingress Model Travel Time Analysis Results

The primary output of the models are vehicle travel times between freeway off-ramps and parking locations. As previously noted, vehicle travel times are helpful for understanding the projected typical arrival experience for an event attendee traveling in a vehicle. As described in the Traveler Behavior Adjustments to Traffic Volumes section (and shown in **Inset 2 and 3**), key travel times/routes from SR 87 and or I-280, identified by SSE for their importance, were selected for analysis and comparison. The travel times shown in **Table 1** represent the modeled average time a vehicle takes to travel from the freeway exit to the indicated parking location during the ingress 6:30 – 7:30 PM hour for both scenarios. The increases in average travel times range from a couple of minutes to an approximately seven-minute increase to travel from the SR 87 off-ramp at Julian Street to parking lot C2. The representative travel routes that correspond to the average travel times are shown in **Inset 4**.

**Table 1: Representative SAP Center Event Attendee Vehicle Travel Times/Routes**

Route (Approx. Distance)	Non-Event Day	Event Day	Delta
Lot C2 via Julian Street/Montgomery Street (0.6 miles)	8 – 9 minutes	12 – 13 minutes	+3 – 5 minutes
Lot C2 via Santa Clara Street (0.4 miles)	1 – 2 minutes	3 – 4 minutes	+1 – 2 minutes
Delmas Parking via Santa Clara Street (0.1 miles)	< 1 minute	< 1 minute	0 minutes
Lot D7 via Bird Avenue (0.5 miles)	3 – 4 minutes	9 – 10 minutes	+5 – 7 minutes
Lot D4 via Santa Clara Street (0.3 miles)	1 – 2 minutes	3 – 4 minutes	+1 – 2 minutes

Source: Fehr & Peers, May 2021



*Inset 4. Representative SAP Center Event Attendee Vehicle Travel Routes to Select Parking Locations*

Note: The Lot D4 via Santa Clara Street route was added after the other four routes. There was enough time to determine modeled travel time results for this route (as shown in the Model Travel Time Results section), but not enough time before deadline to determine observed (2019) vehicle travel times.

Source: Fehr & Peers, 2021.



## Fehr & Peers Ingress Analysis Assessment

The travel time results presented in **Table 1** are based on a series of informed, but often conservative assumptions with respect to 1) how attendees of SAP Center events will travel in the future following the evolution of the Downtown West area and 2) how other travelers will alter their behavior in the future.

The results offer evidence that under this set of conditions the answer to the central question of whether the future roadway network could accommodate activity from Downtown West and SAP events is “yes” – the increases in average travel times for key routes using a set of frequently conservative assumptions and without the benefit of additional transportation management strategies are within the range of a couple of minutes per attendee - meaning that the land use and roadway network changes associated with the Downtown West project are not expected to materially change the travel experience of SAP Center attendees as measured by vehicle travel times. In summary:

- Vehicles traveling to the SAP Center will only experience an additional 0 to 7 minutes of travel time as compared to non-event days after Downtown West’s buildout.
- The Downtown West project does not reduce the overall capacity of the street network to access or exit from SAP center events
- This analysis is based on informed, but conservative assumptions:
  - Assumes a 25% reduction of background traffic to account for individuals who shift or adjust their travel behavior during event times which is conservative as compared to the existing travel patterns seen today
  - Assumes event attendees will travel by similar modes and times as seen today following the build out of the Diridon Station Area. With over 300k of active uses, over half the Downtown West residential, and multiple transit options within a 5-minute walk of the SAP Center, attendees will be able to walk, bike, and take transit to the SAP Center, as well as arrive early and stay after SAP events to enjoy the surrounding area.





# SSE Ingress Model Peer Review

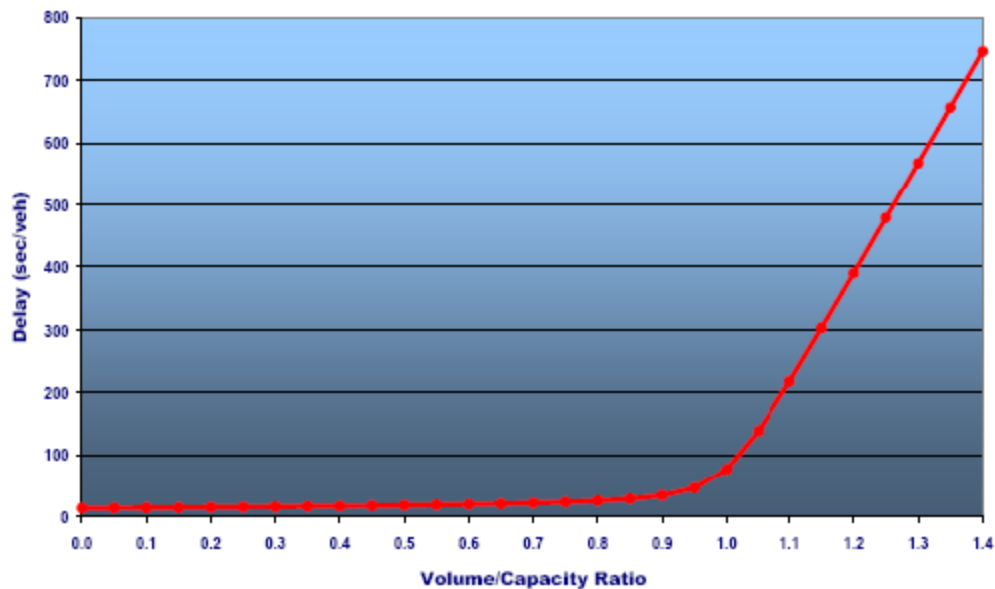
Krupka Consulting performed an ingress analysis, “Autumn Corridor Intersection Assessment,” February 2021 (included in the **Appendix B**) for SSE decision makers. The analysis focused on the four Autumn Street intersections between Santa Clara Street and the Bird Avenue/ Park Avenue intersection to determine whether the Downtown West proposed three-lane cross-section of Autumn Street can accommodate SAP event traffic. The ingress analysis differed from the Fehr & Peers ingress analysis, both methodologically and in terms of output, in several ways:

- The ingress analysis performed for SSE (“SSE ingress model”) focuses exclusively on intersection delay and level of service (LOS) of four intersections along Autumn Street as opposed to the comprehensive network developed to evaluate travel times of attendees arriving via vehicles to the main parking locations.
- The scenarios included in the SSE ingress model and those conducted by Fehr & Peers are different. The SSE ingress analysis compares three scenarios:
  - Existing (year 2013) volumes with SAP Center traffic: These intersection traffic volumes were taken from San José Ballpark Supplemental Traffic Analysis, February 2010. Presumably the earliest these traffic counts could have been collected was during the 2009 NHL hockey season between January and June of 2009. Meaning the “existing” traffic counts are at minimum 12 years old; potentially older than that. The intersection LOS results from this “existing” scenario are being compared to results from a scenario meant to approximate year 2040 conditions: a 30 plus year difference. As discussed below, the future year conditions are not meant to be taken as a given either.
  - Cumulative Year 2040 Conditions including SAP center traffic: As described in the Krupka memo, the intersection traffic volumes are meant to approximate a scenario in which the full buildout of the DSAP occurred. The DSAP is a long-range plan that identifies the amount of development that could occur in the Diridon Station area; besides Downtown West, no major development applications have come forward. As noted in the DSAP Traffic Impact Analysis in 2013 on page 69, *“The DSAP Master Plan envisions buildout of the DSAP to take as long as 35 years. The projected intersection levels of service and identified improvements are based on traffic projections some 35 years into the future. It is likely that traffic conditions will change over a timeframe of that length”*. Further, although Downtown West represents most of the DSAP development proposal on the west side of SR 87, **XXX development** is also included on the remaining DSAP east of SR 87. Further, the intersection volumes are an approximation based on available information, which was included in the Downtown West LTA



(Scenario 3b) and the 2013 DSAP TIA, since only one of the four intersections included in the memo was included in the Downtown West LTA.

- Cumulative 2040 with SSE recommended geometry: A scenario in which SSE's preferred intersection geometry for Autumn Street is modeled, with accompanying intersection LOS results using the same Cumulative Year 2040 operations with an event at SAP Center described above.
- The intersection geometries of the four Autumn Street intersections are the same in both analyses, however the SSE ingress model does not include the temporary closure of Autumn Street between Santa Clara and St. John streets prior to events—which has been in place for many years—to facilitate pedestrian access to the arena and ticket booth, termed “Sharks Alley.”
- The modeling software used for the SSE and Fehr & Peers analyses are different, and these models are typically employed to understand different types of traffic conditions. The SSE ingress model is based on Highway Capacity Software (HCS) intersection analysis software, which is more typically employed to model conditions at isolated intersections operating below capacity. The Fehr & Peers ingress model is built using SimTraffic software, which is more typically employed to model congested travel conditions, where it is essential to capture the interactions between vehicles and intersection control in order to accurately model travel conditions, including vehicle travel times and intersection delay.
- The SSE ingress model traffic volumes do not account for how the amount and location of parking locations would change in the future (as described in the Fehr & Peers Ingress Analysis section) for SAP Center event attendees, the closure of Autumn Street for Sharks Alley, or the dynamic lanes proposed for Autumn Street as part of the Downtown West project.
- The SSE analysis/memo, by both reporting and comparing intersection delay projected to operate above a 1.0 intersection volume to capacity (v/c) ratio, provides information that is not realistic or accurate. The relationship between intersection delays and v/c ratio is shown in **Inset 6**; specifically, how the deterministic HCM intersection delay methodology results in intersection delay that transfer from a steady increase in delay to a parabolic shift in delay around the point at which intersection capacity is reached. This shift in the delay curve is why it is typical in traffic reports to see intersection delay results for intersections operating at LOS F to report “> 80 seconds of delay” accompanied by intersection v/c ratio (as vehicle travelers do not actually experience these types of delays, except in rare circumstances). In these scenarios the intersection v/c ratio is a better assessment tool as the delay calculation is not meant to operate as a theoretical, in the way that v/c ratios are able to. Further, linear comparison of intersection delay results beyond the capacity point to intersection delay results operating below the capacity point (i.e., Table 2 of the SSS memo) are not accurate as they do not consider the deflection of the vehicle delay curve.



*Inset 6. Figure V.A.3-3 Sensitivity of Vehicle Delay to Volume/Capacity Ratio*

Source: 2000 *Highway Capacity Manual*, Chapter 16, Exhibit 16-14

## Peer Review Assessment

Based on our assessment, the analysis employed by Krupka Consulting took a narrow and conservative approach in trying to provide evidence in response to the central question: “can the future roadway network accommodate activity from Downtown West and typical vehicle traffic associated with pre- and post-events at the SAP Center?” It looks at the theoretical, projected performance of a subset of intersections rather than taking a holistic view of mobility in the area. Further, it does not take into account the changing nature of the transportation system around Diridon Station, including major aspects like roadway configurations and the fact that parking locations used by SAP Center attendees will change in the future. Further, it does not take into account how people alter their travel behavior on days in which there are events at urban arenas. A narrow and/or conservative approach are not themselves issues, however the analysis relies on incomplete and incorrect data and assumptions, which combined with distortions of industry practices and standards is rendered fatally flawed with respect to addressing the central question.



# Egress Analysis

A SimTraffic model was developed by Nelson/Nygaard, a transportation consultant to the Downtown West project sponsor. The purpose of the analysis/model was to determine the percentage of vehicles that could exit the 16 parking locations where SAP event attendees typically park within 30 minutes following the event, following the development of Downtown West. The 30-minute egress time is not an established threshold or requirement, but a general benchmark to evaluate ease of egress. The methodology and model inputs and outputs are described in *"SAP Egress Traffic Simulation Results under High and Low Traffic Management Scenarios,"* November 2020 (included in the **Appendix C**).

The egress model included 16 parking locations containing 5,733<sup>8</sup> parking spaces that are accessible within 1/3 mile. The model extents are approximately within a 1/2-mile radius of the SAP Center, where all the parking locations can be reached with an approximate 5-15 minute walk from the SAP Center. The egress model simulated the time immediately following the end of a typical weekday event at SAP Center (i.e., 9:45–10:45 PM).

## Egress Model Review

Fehr & Peers reviewed the egress model and methodology of its development in December 2020 and made the following observations:

- The model includes the Downtown West proposed changes to the existing roadway network, including converting Autumn Street to two-way circulation and extending Cahill Street to the north and south of its current terminus at Santa Clara Street (north) and San Fernando Street (south).<sup>9</sup>
- The model includes traffic counts collected following a San José Sharks hockey game on Thursday, December 27<sup>th</sup>, 2018, which is during the winter holidays period. Traffic counts collected during this time account for the parking locations as they currently are, but not as they necessarily will be following development of the Downtown West project. Driveways associated with parking lot parcels that would be developed are not included in the model. However, the vehicle trips associated with these driveways were not removed from the network. Thus, the egress model serves as an approximation of the future condition since it includes vehicles associated with parking locations that would be developed. The effect of this is more "background" vehicle trips represented in the egress model, which could translate into higher vehicle travel times and a lower vehicle exiting rate for some parking locations. The fact that the traffic counts were collected

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<sup>8</sup> 5,733 parking stalls reserved for game-day usage across 16 facilities within a 13-minute walk of the SAP Center (from the NN memo)

<sup>9</sup> The full details of proposed roadway changes can be found in the Downtown West project application materials.

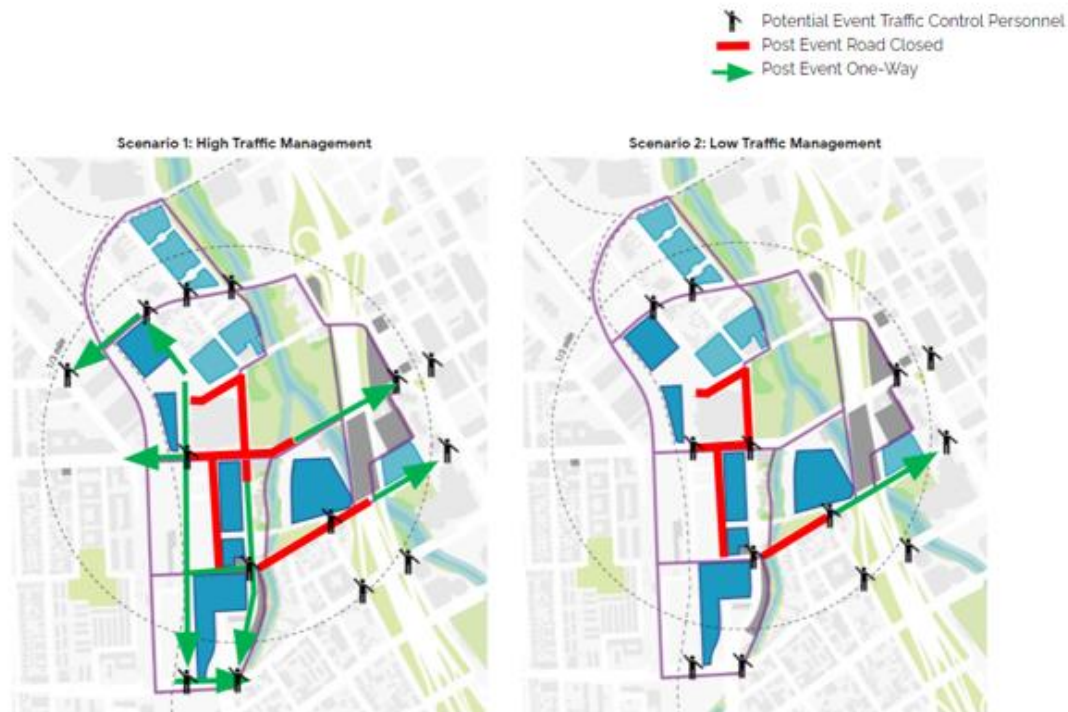


during the winter holidays could also affect whether the background traffic volumes represent “typical” conditions, though the magnitude and direction of the effect is unknown.

- The model accounts for existing background vehicle trips, but does not account for Downtown West project-generated traffic volumes. Given the analysis hour the project-generated traffic volumes could represent approximately 20-25 percent of the PM peak hour vehicle trips<sup>10</sup>. The effect of this decision is to reduce background vehicle trips, which could translate into lower vehicle travel times and a higher vehicle exiting rate for some parking locations.
- Vehicles begin exiting from the parking locations at 9:45 PM and exit at uniform rates over the course of the modeled hour. This does not consider that walk times from the SAP Center to parking locations are different for each parking location, which are roughly 5-15 minutes. It also assumes that some event attendees will not patronize local businesses i.e., bars, restaurants following events at SAP Center. The effect of this is that parking locations further away from SAP Center begin generating exiting vehicles at the same time as those closer to SAP Center; however, it is unclear how this would affect reported vehicle travel times.
- Parking locations were not programmed to stop generating exiting vehicles following the departure of what would be the last remaining vehicle (i.e., vehicles kept exiting an “empty” parking garage). The effect of this is to produce more vehicles on the modeled roadway network, which could translate into higher vehicle travel times and a lower vehicle exiting rate for some parking locations.
- Two “traffic management” scenarios were modeled for “low” and “high” traffic management. Traffic management refers to the combination of city traffic control personnel directing traffic and/or manually controlling the phasing of traffic signals to prioritize the egress of attendee vehicles exiting the area. It also includes post-event road closures and direction changes (i.e., one-way roadways). The difference between low and high is degrees—the high scenario had comparatively more traffic control personnel, road closures, and directional changes (as shown in **Inset 7**).

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<sup>10</sup> Based on a comparison of the 5 pm to 9 pm (10 pm is not included) vehicle trip by hour for multi-family residential, office, and retail as found in the ITE Guide handbook.



*Inset 7. “High” and “Low” Traffic Management Scenarios modeled as part of Egress Analysis*

Source: Nelson / Nygaard, 2020

- The effect of traffic control personnel’s ability to prioritize post-event traffic was not fully accounted for in the egress model. This would have been done by using traffic signals to approximate the way traffic control personnel assign right of way at intersections. Further, the lane utilization rates of the roadway network could have been modeled differently to account for more efficient use of the roadway by vehicles. The effect of these decisions is for modeled traffic operations to be less efficient, which could translate into higher vehicle travel times and a lower vehicle exiting rate for some parking locations.

## Egress Model Outputs

The egress model analysis outputs were reported in terms of percent of parking location capacity that could exit within 30 minutes and 45 minutes. For the low traffic management scenario approximately 68 and 88 percent of the post-event traffic could exit the parking locations. For the high traffic management scenario approximately 70 and 86 percent of the post-event traffic could exit the parking locations. Fehr & Peers was able to produce the same egress results from the models using the same software.



## Fehr & Peers Egress Analysis Assessment

In sum, the decision to not remove vehicles from the network from parking lots that would be developed, stop vehicle generation once parking locations are empty, and inability to fully account for the efficiency improvements of traffic control personnel and lane utilization rates could have led to comparatively higher vehicle travel times and a lower vehicle exiting rate for some parking locations. Alternatively, the decision to not include Downtown West-generated vehicle trips could have led to comparatively lower vehicle travel times and a higher vehicle exiting rate for some parking locations. The decision to have parking locations begin exiting at the same time could influence reported travel times, but the direction and magnitude is unclear. However, following review and on balance, we think the egress model and methodology used to approximate the “high” and “low” traffic management scenarios were appropriate for the egress travel time analysis, with the results likely shaded to the conservative side due to methodology decisions made. In summary:

- Approximately 4,000 vehicles (78% of the 5,125 required in the AMA) can exit within 30 minutes of an SAP Center event and are within the tolerances of other urban venues
- The analysis included a range of assumptions and methodologies that overall could lead to faster travel times or higher vehicle exiting rates for certain parking locations
- This analysis assumed a range of scenarios, but recognizes the importance of post-game traffic and parking management