FEHR PEERS

TECHNICAL MEMORANDUM #1

Date: August 13, 2019

To: File

From: Fehr & Peers

Subject*: *Supplemental Existing Conditions Information

LA2018-3002

This memorandum presents additional information related to the Environmental Setting/Existing Conditions that was not included in Chapter 3.14 due to space constraints.

I. Description of Study Roadways

Below are descriptions of important roadways located within the study area that were not described in Chapter 3.14.

- La Cienega Boulevard is designated as a major arterial in the City of Inglewood General Plan that runs north/south west of the project site and generally provides two travel lanes and left turn pockets at major intersections in each direction. Limited parking is available on northbound of the street south of Century Boulevard. The posted speed limit is 40 miles per hour (mph).
- Inglewood Avenue is designated as a minor arterial in the City of Inglewood General Plan that runs north/south west of the project site and generally provides one travel lane in each direction and a center turn lane. Parallel parking is available on both sides of the street. The posted speed limit is 35 mph.
- Van Ness Avenue is designated as a minor arterial in the City of Inglewood General Plan that runs north/south east of the project site of the Study Area and provides two travel lanes in each direction with left turn pockets at major intersections south of Century Boulevard. Van Ness Avenue provides one travel lane on each direction and has a center turn lane north of Century Boulevard. Parallel parking is available on both sides of the street. The posted speed limit is 35 mph.
- Western Avenue is designated as Avenue II in the City of Los Angeles Mobility Plan that runs north/south east of the project site and provides two travel lanes in each direction and has a center turn lane. Parallel parking is available on both sides of the street. The posted speed limit is 35 mph.
- Florence Avenue is designated as a major arterial in the City of Inglewood General Plan that runs east/west north of the project site and provides two travel lanes in each direction with a raised median on portions of the roadway. No street parking is available on either side of the street in the study area. Eastbound bike lanes are present east of Prairie Avenue, and westbound bike lanes exist east of Market Street. The posted speed limit is 40 mph.

- Pincay Drive is designated as a collector in the City of Inglewood General Plan that runs east/west north of the project site and provides two travel lanes in each direction with a center turn lane. No street parking is available on the north side of the street and parking is available on the south side of the street west of Cullen Way in the study area. The posted speed limit is 45 mph.
- Arbor Vitae Street is designated as a major arterial in the City of Inglewood General Plan that runs east/west north of the project site. The street provides two travel lanes in each direction with a center turn lane west of La Brea Avenue and one travel lane in each direction east of La Brea Avenue. Parallel parking is available on either side of the street except west of Ash Avenue. The posted speed limit is 35 mph.
- Lennox Boulevard is designated as a minor arterial in the City of Inglewood General Plan that runs east/west south of the project site. The street provides one travel lane in each direction and a center turn lane west of Hawthorne Boulevard, and two travel lanes in each direction Hawthorne Boulevard. Parallel parking is available on both sides of the street. The posted speed limit is 30 mph.
- Imperial Highway is designated as a major arterial in the City of Inglewood General Plan that runs east/west south of the project site, providing three travel lanes in each direction. The street contains a raised median with left-turn lanes on portions of the roadway. Parallel parking is available on both sides of the street. The posted speed limit is 40 mph.
- 120th Street is designated as a collector in the City of Hawthorne General Plan that runs east/west south of the project site, providing two travel lanes in each direction. Parallel parking is available on the north side of the street. The posted speed limit is 40 mph.

II. Intersection Analysis Methods

ICU/CMA Analysis Methods

Study intersections in the City of Inglewood, City of Hawthorne, and County of Los Angeles were analyzed using the Intersection Capacity Utilization (ICU), while intersections in the City of Los Angeles were analyzed using the Critical Movement Analysis (CMA) methodology. The CALCADB software package developed by Los Angeles Department of Transportation (LADOT) was used to implement the CMA methodology.

The City of Los Angeles' Automated Traffic Surveillance and Control (ATSAC) system is a computer-based traffic signal control system that monitors traffic conditions and system performance to allow ATSAC-operations to manage signal timing to improve traffic flow conditions. The Adaptive Traffic Control System (ATCS) is an enhancement to ATSAC and provides fully traffic-adaptive signal control based on real-time traffic conditions. The project team confirmed with LADOT that all study intersections within the City of Los Angeles are part of the ATSAC and ATCS systems, with the exception of Van Ness Avenue & 96th Street/Hardy Street and Van Ness Avenue & Century

Boulevard. In accordance with established City of Los Angeles procedures, a 0.10 V/C reduction was applied at each intersection where ATSAC and ATCS is implemented.

Micro-Simulation

In order to effectively evaluate the high level of congestion before and after NBA games, a micro-simulation model was developed using the Synchro/SimTraffic software for the intersections near the IBEC. This approach is consistent with Federal and State guidance for operations analysis in congested locations with closely spaced intersections. Unlike static traffic operations analysis, a micro-simulation model analysis captures the effects that closely-spaced intersections can have on study intersections such as queuing from adjacent intersections into a study intersection or vehicle platooning from traffic signal coordination at upstream intersections. Microsimulation models also include the effects of pedestrians on network performance. The video animation provided by a microsimulation model also helps by visually presenting the corridor queuing and congestion issues, which are used to verify the adequacy of the proposed design concepts in terms of geometrics dimensions and roadway capacity.

Pre-event and post-event hours were analyzed using the Highway Capacity Manual (HCM) methodology. Each study intersection was evaluated based on the volume of traffic traveling through the intersection, the lane geometries, the signal phasing, and pedestrian volumes and interactions at the street crosswalks. These characteristics were used to evaluate the operation of each signalized intersection, which is described generally in terms of LOS. The HCM method measures LOS on the average control delay experienced per vehicle. LOS categories range from excellent, nearly free-flow traffic at LOS A to overloaded, stop-and-go conditions at LOS F.
In addition to intersections analyzed using the Synchro/SimTraffic software, Caltrans ramp terminal intersections were analyzed using the Synchro software using the HCM analysis to calculate LOS using a delay based methodology.

The microsimulation model focuses primarily on the study intersections along the Century Boulevard and Prairie Avenue corridors, and contains a total of 65 intersection. The extent of the model was identified based access to the project site and connections to regional access using the I-105 and I-405 freeways.

The microsimulation model was developed using Synchro/SimTraffic software. The Synchro/SimTraffic model was validated to the analysis periods existing conditions using the criteria contained in *Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software* (Federal Highway Administration, 2004). The validation criteria emphasize matching existing demand throughout the model and replicating observed queuing and congestion. The simulation model was developed as follows:

1. Volumes were balanced between intersections and driveways within the network, ensuring the model is accurately assigning the correct number of vehicles for each turning movement at intersections within the network. It also ensures continuity between intersections for counts that were taken on different days.
2. Traffic signal control data (i.e. signal phasing/timings) were provided by the City of Inglewood, the City of Los Angeles, the City of Hawthorne, Los Angeles County, and Caltrans. The signal timings were confirmed during field observations and adjusted as necessary to match observed cycle lengths and phase lengths. The posted speed limits for the network and peak parking restrictions were collected during field observations. Lane configurations at each intersection were taken from aerial photographs and confirmed during field observations.
3. Operational observations were also made during field visits on Friday, April 27th and Saturday, May 19th to ensure that the model accurately reflects the existing conditions during the analysis periods. Driver behavior was observed for any non-adherence of signage and roadway striping. Queue lengths at left- and right-turn lanes were observed at freeway off-ramps and major intersections. If queues backed up into the through travel lanes, observed operational problems at the intersection were indicated.
4. During the pre-event peak hour, substantial queuing was observed along Florence Avenue eastbound extending from the intersection with Prairie Avenue upstream beyond Centinela Avenue to Hillcrest Boulevard. The queuing through this segment is potentially related to lane reassignment as part of the Crenshaw Line light rail construction occurring on the north side of the road. Large queues were also observed for eastbound travel on Century Boulevard at the intersections with La Brea Avenue/Hawthorne Boulevard, Prairie Avenue, and Crenshaw Boulevard. The observed queue lengths were used to validate the model. Other queues observed were typically related to left turns queuing beyond the storage length of the striped turn pocket, particularly at locations such as Prairie Avenue and Century Boulevard (southbound and northbound lefts), or at Century Boulevard and Club Drive (eastbound and westbound lefts). These queues were generally fully served within one or two signal cycles despite exceeding the storage space.
5. Existing directional travel times were collected by conducting using "floating car" travel time runs, where a vehicle was driven the length of the Prairie Avenue and Century Boulevard corridors several times during each analysis period. Travel time runs were conducted during all three analysis periods by driving along the corridor at the speed limit and recording travel times using a GPS tracker as well as with a stopwatch. The travel times from both methods produced similar results and were used to validate the model.

The default Synchro/SimTraffic parameters for geometrics and driver behavior were iteratively adjusted at congested intersections until the model was validated to observed conditions. This includes adjusting default turning speeds to reflect the intersection widths and turn radii that influence observed driver behavior, and adjusting the parameters for turn lane paths and vehicle

following or lane positioning distances. In limited cases, link speeds were adjusted from the speed limit to better match observed conditions. The adjustments made result in vehicle queues, intersection delays, and corridor travel times that more closely reflect conditions observed in the field.

III. Bus Routes

The following describes bus routes operated by Metro, Torrance Transit, and County of Los Angeles that operate within the study area, but do not stop within ½-mile of the project site. Those lines that stop within one-half mile of the project site are described in Chapter 3.14.

- Metro Line 40 – is a north/south line that runs between South Bay Galleria and Patsaouras Transit Plaza/Union Station. The line has 10- to 15-minute headways during the AM peak period, 20- to 30-minute headways during the PM peak period and 20- to 25-minute headways during evening on the weekend. The line runs on Hawthorne Boulevard, La Brea Avenue, Florence Avenue and Crenshaw Boulevard within the study area, with stops every few blocks. Project site access is provided via stops at the intersections of Century Boulevard & La Brea Avenue and 104th Street & Hawthorne Boulevard.
- Metro Line 442 – is a north/south line that runs between Hawthorne/Lennox Station and Patsaouras Transit Plaza/Union Station. The line has 40- to 45-minute headways during the AM peak period, 55- to 60-minute headways during the PM peak period and no service on the weekend. The line runs on Hawthorne Boulevard, La Brea Avenue and Manchester Avenue within the study area, with stops every few blocks. Project site access is provided via stops at the intersections of Century Boulevard & La Brea Avenue and 104th Street & Hawthorne Boulevard.
- Metro Line 740 – is a north/south line that runs between South Bay Galleria and Expo/Crenshaw Station. The line has 15- to 20-minute headways during the AM peak period, 20- to 25-minute headways during the PM peak period and 20- to 25-minute headways during evening on Saturday. No service is available on Sunday and holidays. The line runs on Hawthorne Boulevard, La Brea Avenue, Florence Avenue and Crenshaw Boulevard within the study area, with stops every few blocks. Project site access is provided via stop at the intersection of Century Boulevard & La Brea Avenue.
- Metro Line 710 – is a north/south line that runs between the South Bay Galleria and Wilshire/Western Purple Line Station. The line has 10- to 20-minute headways during the AM peak period, 20- to 30-minute headways during the PM peak period and 20- to 25-minute headways during evening on Saturday. No service is available on Sunday and holidays. The line runs on Crenshaw Boulevard within the study area, with stops every few blocks. Project site access is provided via stop at the intersection of Century Boulevard & Crenshaw Boulevard.

- Metro Line 210 – is a north/south line that runs between the South Bay Galleria and Vine & Hollywood Station. The line has 10- to 20-minute headways during the AM peak period, 20- to 30-minute headways during the PM peak period and 20- to 30-minute headways during evening on weekend. The line runs on Crenshaw Boulevard within the study area, with stops every few blocks. Project site access is provided via stop at the intersections of Century Boulevard & Crenshaw Boulevard and 104th Street & Crenshaw Boulevard.
- Metro Line 209 – is a north/south line that runs between the Vermont/Athens Station and Wilshire/Western Station. The line has 50- to 60-minute headways during the AM peak period, 60- to 65-minute headways during the PM peak period and no service on the weekend. The line runs on Van Ness Avenue within the study area, with stops every few blocks. Project site access is provided via stop at the intersections of Century Boulevard & Van Ness Avenue and 104th Street & Van Ness Avenue.
- Metro Line 757 – is a north/south line that runs between the Crenshaw Green Line Station and Hollywood/Western Station. The line has 10- to 15-minute headways during the AM peak period, 10- to 20-minute headways during the PM peak period and no service on the weekend. The line runs on Western Avenue within the study area, with stops every few blocks. Project site access is provided via stop at the intersection of Century Boulevard & Western Avenue.
- Metro Line 207 - is a north/south line that runs between the Western & Imperial Station and Hollywood/Western Station. The line has 10- to 15-minute headways during the AM peak period, 10- to 20-minute headways during the PM peak period and 20- to 30-minute headways during evening on weekend. The line runs on Western Avenue within the study area, with stops every few blocks. Project site access is provided via stop at the intersections of Century Boulevard & Western Avenue and 104th Street & Western Avenue.
- Metro Line 607 – travels on a loop route that runs primarily La Brea Avenue, Manchester Boulevard, Locust Street and Florence Avenue in the study area with stop at Inglewood Transit Center on La Brea Avenue. The line has 55- to 60-minute headways during the AM and PM peak periods and no service on the weekend.
- Metro Line 115 – is an east/west line that runs between the Pacific & Culver Station and Norwalk Station. The line has 10- to 15-minute headways during the AM peak period, 10- to 20-minute headways during the PM peak period and 20- to 30-minute headways during evening on weekend. The line runs on Manchester Boulevard within the study area, with stops every few blocks. Project site access is provided via stop at the intersection of Manchester Boulevard & Prairie Avenue.
- Metro Line 120 – is an east/west line that runs between the Aviation/LAX Station and Whittwood Town Center in Whittier. The line has 30- to 40-minute headways during the AM peak period, 15- to 20-minute headways during the PM peak period and 55- to 60-minute headways during evening on weekend. The line runs on Imperial Highway within the study area, with stops every few blocks. Project site access is provided via stop at the

intersections of Prairie Avenue & Imperial Highway, Doty Avenue & Imperial Highway, Yukon Avenue & Imperial Highway and Crenshaw Boulevard & Imperial Highway.

- Metro Line 126 – is an east/west line that runs between the Manhattan Beach & Valley Drive Station and Hawthorne Station. The line has 60- to 65-minute headways during the AM peak period, 60- to 70-minute headways during the PM peak period and no service on weekend. The line runs on 120th Street within the study area, with stops every few blocks. Project site access is provided via stop at the intersections of Prairie Avenue & 120th Street and Crenshaw Boulevard & 120th Street.
- Metro Line 111 - is an east/west line that runs between the LAX City Bus Center and Norwalk Station. The line has 30- to 35-minute headways during the AM peak period, 10- to 20-minute headways during the PM peak period and 15- to 20-minute headways on Saturday. No service is available on Sunday and holidays. The line runs on Florence Avenue within the study area, with stops every few blocks. Project site access is provided via stop at the intersections of Florence Avenue & Crenshaw Boulevard.
- Torrance Transit Line 5 – is a north/south line that runs between Pacific Coast Highway & the Crenshaw/I-105 Station. The line has 60-65 minute headways during the AM peak period, 55-60 minute headways during the PM peak period, and 50-60 minute headways on Saturday. No service is provided on Sunday and holidays. The line runs on Crenshaw Boulevard, Imperial Highway and Van Ness Avenue within the study area, with stops every few blocks. Project site access is provided via stop at the intersections of Crenshaw Boulevard & Imperial Highway and Van Ness Avenue & Imperial Highway.
- Torrance Transit Line 10 – is a north/south line that runs between the Crenshaw Boulevard at Pacific Coast Highway and Crenshaw Station. The line has 25- to 35-minute headways during the AM peak period, 30- to 35-minute headways during the PM peak period and 50- to 55-minute headways during evening on Saturday. No service is provided on Sunday and holidays. The line runs on Crenshaw Boulevard within the study area, with stops every few blocks. Project site access is provided via stop on Crenshaw Boulevard under I-105.

To calculate the existing hourly directional capacity for the above rail and bus routes the following approach was used:

- Vehicle seated capacity
    - Light rail seated capacity for Metro's Kinkisharyo manufactured light rail vehicles is 68 seats. The Metro Green Line currently runs two-car trains, for a seated capacity of 136 passengers per train.
    - Seated capacity for 40-foot buses is approximately 40 seats. Metro has a variety of bus vehicle sizes, including 68-foot articulated buses, but generally most Metro Local routes, such as those in the study area, operate with 40-foot buses.

- Vehicle total capacity
    - Metro vehicles have the capacity for standing passengers in addition to the seated capacity. Metro's Transit Service Policy (October 2015) specifies acceptable ratios of total passengers (inclusive of seated and standing passengers) to seated capacity depending on the type of vehicle, the headways, and whether the vehicle is operating during the weekday peak and off-peak periods. The acceptable ratio for rail is 1.75 during the peak period (for a total two-car train capacity of 238 passengers), and 1.25 during the off-peak periods (for a total two-car train capacity of 170 passengers). Based on Metro's service standards, these ratios should not be exceeded for at least 95% of all hourly periods.
    - For bus, the acceptable peak period ratio ranges from 1.4 to 1.0 depending on bus frequency, with acceptable higher ratios the more frequent the route. During the off-peak, acceptable ratios range from 1.3 to 0.75. Table 3.14-1 indicates the applicable ratios and capacity based on a 40 ft. bus given the frequency of the study area bus routes.
- Frequency—The number of bus and train trips per hour, which were taken from existing online schedules in April 2019. To calculate hourly capacity, the vehicle total capacity is multiplied by the number of bus or train trips per hour (per direction).

TABLE 3.14-1
STUDY AREA BUS ROUTES PEAK HOUR PERIOD LOAD RATIO

Line	Stop Name	Direction	Peak Hour Frequency	Peak Capacity Factor	Peak Capacity (per vehicle)	Off Peak Hour Frequency	Off-Peak Capacity Factor	Off Peak Capacity (per vehicle)
117	Century / Prairie	E	4	1.3	52	2	1.2	48
117	Century / Prairie	W	4	1.3	52	2	1.2	48
211	Prairie / Century	N	2	1.2	48	-	-	-
211	Prairie / Century	S	2	1.2	48	-	-	-
212	Prairie / Century	N	3	1.3	52	2	1.2	48
212	Prairie / Century	S	4	1.3	52	2	1.2	48

Notes: The bus capacity is calculated considering a 40 ft. bus with seating capacity of 40 passengers.
Line 211 does operate on weekends.

Table 3.14-2 presents the average hourly passenger loads (based on per vehicle average loads), and hourly capacity, and the reserve hourly capacity available to serve future ridership (both from

the project as well as other non-projected related developments in the study area). All transit routes have reserve capacity available to serve future ridership demand.

TABLE 3.14-2
EXISTING TRANSIT LOAD – PRE-EVENT PEAK HOUR WEEKDAY

Line	Stop Name	Direction	Average Load	Frequency	Peak Hour Load	Peak Hour Capacity	Remaining Capacity
Green Line	Hawthorne / Lennox	E	138	10	1380	2380	1000
Green Line	Hawthorne / Lennox	W	13	10	130	2380	2250
117	Century / Prairie	E	24	4	95	208	113
117	Century / Prairie	W	8	4	33	208	175
211	Prairie / Century	N	5	2	9	96	87
211	Prairie / Century	S	5	2	9	96	87
212	Prairie / Century	N	14	3	42	156	114
212	Prairie / Century	S	9	4	37	208	171

TABLE 3.14-3
EXISTING TRANSIT LOAD – PRE-EVENT PEAK HOUR WEEKEND

Line	Stop Name	Direction	Average Load	Frequency	Peak Hour Load	Peak Hour Capacity	Remaining Capacity
Green Line	Hawthorne / Lennox	E	63	4	250	680	430
Green Line	Hawthorne / Lennox	W	17	4	68	680	612
117	Century / Prairie	E	33	2	66	96	30
117	Century / Prairie	W	11	2	23	96	73
211	Prairie / Century	N	-	-	-	-	-
211	Prairie / Century	S	-	-	-	-	-
212	Prairie / Century	N	11	2	21	96	75
212	Prairie / Century	S	9	2	19	96	78

Note: Line 211 does operate on weekends.