

Application 06-12-005 *et al.*

Exhibit \_\_\_\_\_

Date: August \_\_\_\_, 2008

**PREPARED TESTIMONY  
OF  
NICK CONNOR**

**Q. Please state your name, professional position, and business address.**

A. My name is Nick Connor. I presently serve as President of Legion America Inc., a subsidiary of Legion Limited (“Legion”). My business address is 20 Exchange Place, New York, NY 10005.

**Q. Please describe your educational background and your professional qualifications.**

A. My educational and professional background is in finance and law. I am a graduate of Durham University and Nottingham Law School. I am a founding director of Legion Limited and I have participated in all aspects of the company's development. In early 2006, I established our presence in the North American market.

**Q. On whose behalf are you providing the present testimony?**

A. I am providing this testimony on behalf of the Exposition Metro Rail Construction Authority (“Expo Authority”).

**Q. Please explain the services Legion has provided to Expo Authority.**

A. Legion has applied its proprietary software to provide simulations and analyses of pedestrian flows for Expo Authority in connection with the design and construction of the Exposition Metro Light Rail Project (“Expo Rail”), in Los Angeles County.

**Q. What is the purpose of your testimony?**

A. My testimony is intended to explain two studies and associated simulations conducted by Legion in order to analyze the pedestrian flows anticipated with the construction of the proposed Expo Rail Line in the vicinity of Dorsey High School and the Foshay Learning Center, respectively. My testimony will first explain what Legion does. Then I will describe the analysis that has been performed of pedestrian traffic that presently exists in the vicinity of the intersection of Farmdale Avenue and Exposition Boulevard in the City of Los Angeles and that is anticipated in that vicinity with the construction of an at-grade crossing of Farmdale Avenue and the Expo Rail tracks. My testimony also will describe several recommendations that my firm has presented to Expo Authority that will further enhance pedestrian safety at the Farmdale Expo Rail crossing. Next, my testimony will describe the analysis that has been performed of pedestrian traffic anticipated at the three intersections in the vicinity of Foshay Learning Center, namely where Exposition Boulevard crosses the Harvard pedestrian underpass, Western Avenue, and Denker Avenue, and will explain the results of that analysis.

**Q. What does Legion do?**

A. Since its founding in 1997, Legion has engaged in software development and consulting services with a focus on pedestrian simulation for use in optimizing the design and operation of public spaces, such as transport terminals, sport and entertainment venues, shopping centers, commercial and public buildings, and venues for major events such as the Olympics. We maintain a singular focus on the design, development, and marketing of high-quality software useful to optimize spaces for people.

Legion's simulations are an efficient and methodical way of dealing with some of the most difficult issues in the engineering of pedestrian spaces in today's urban environments.

For Legion's customers, use of our software and services leads to improved risk management and security planning, better control over costs, and increased comfort and safety in public places. Legion's customers include Transport for London, New York City Transit, Madrid Metro, Amtrak, and MTR Hong Kong. Legion's principal offices are in London, New York City, and Shanghai.

**Q. Please provide a general description of the work and analysis Legion has performed with respect to both the Farmdale Avenue and Foshay pedestrian traffic and safety studies.**

A. Prior to this piece of work, Legion America performed pedestrian analysis on the area surrounding USC and the Memorial Coliseum and advised on how best to manage spectators across Exposition Boulevard following a sell-out game at the stadium. In conjunction with DMJM Harris, Legion subsequently undertook the

Farmdale Avenue and Foshay pedestrian traffic and safety studies. Legion America's work on each project culminated in the preparation of a Pedestrian Analysis Report for Expo Authority, the first of which was presented to Expo Authority and other project stakeholders, including the Commission's Railroad Crossing Engineering Section staff, in April 2007. The second Report, studying pedestrian flows across three intersections near Foshay Learning Center, was presented to Expo Authority's Board and project stakeholders in December 2007. Both reports were included in Expo Authority's submission of Supplemental Information to the Commission on March 28, 2008.

**Q. What has been your personal role in the work Legion America has performed on behalf of Expo Authority?**

A. I directed the project team responsible for conducting the pedestrian simulations for the proposed Vermont and Expo Park stations to serve USC and the Coliseum and personally delivered the results and conclusions of these studies. I have been responsible for oversight on the subsequent studies for the proposed Farmdale, Harvard, Western and Denker Expo Rail crossings.

**Q. Please summarize the main features and recommendations of the Exposition Boulevard & Farmdale Avenue Crossing Pedestrian Analysis Report, dated April 2007 ("Farmdale Report"), starting with the Task Overview and its explanation of the objectives and the key performance measure for the study Legion America conducted.**

A. The objectives of the Farmdale Report were twofold. The first objective of the study was to assess the size and configuration of the proposed queuing areas on

Farmdale Avenue, adjacent to the Expo Rail alignment, during the peak after school period. The second objective of the study was to demonstrate the viability of the proposed grade crossing at the intersection of Farmdale Avenue and Exposition Avenue to the California Public Utilities Commission. The key performance measure for the study is density using Fruin Level of Service (“LOS”) Queuing (a universally accepted set of criteria for safety standards in places of public assembly).

**Q. The Farmdale Report provided a set of assumptions for the study that was conducted. What can you tell us about these assumptions?**

A. The assumptions were provided to us for modeling purposes by Expo Authority. I understand that the input data and assumptions were taken from two sources, manual traffic counts provided by the Los Angeles Department of Transportation (“LA DOT”), as well as observations made in the field by Expo Authority staff, including video footage. According to the data we were provided, some 550 pedestrians use the Farmdale crossing between 3:00 PM and 3:15 PM, with some 400 persons using the crossing within a five-minute period. This peak pedestrian demand occurs just after the conclusion of regular school hours at Dorsey High School and dwindles rapidly after that time.

Second, the Farmdale Report incorporates certain operational assumptions, including “cycle times” for pedestrians’ interactions with the light rail system and with vehicles in the intersection. These cycle times essentially dictate the time interval for pedestrians to cross Exposition Blvd. For the school dismissal period under study, which occurs during the off-peak period for light rail operations, the Farmdale Report assumes 10-minute headways for light rail transit (“LRT”) vehicles in each direction

with trains out of sync and a crossing closure time of 80 seconds. This results in a 5-minute “light rail cycle time” for pedestrians of 80 seconds to stop followed by 220 seconds of “walk” time to cross the tracks. For pedestrian interactions with vehicular traffic (automobiles), the Farmdale Report applies a “vehicle cycle time” of 70 seconds to stop followed by 10 seconds of “walk” time to cross Exposition Blvd. The sources of this information are the LA DOT for street traffic signal operations and the Los Angeles County Metropolitan Transportation Authority (“Metro”) for LRT operations.

**Q. The Farmdale Report next presents an Original Design and a Revised Design, with “queuing areas” and arrows showing traffic flows for the departure of students after school lets out, is that correct?**

A. Yes.

**Q. What is most significant about these two designs and the differences between them?**

A. There are two significant differences between the Original Design and the Revised Design. First, the south queuing area is increased from approximately 1,900 square feet to 2,300 square feet, a 21% expansion intended to address increased pedestrian demand and people waiting on the sidewalk for extended periods. The north queuing area was of sufficient size in the Original Design. Second, moving the crosswalk westward and installing one of three gate options (two manual gates, four manual gates, or one 8-foot automatic gate) will protect against any queuing on the rail tracks. Furthermore, it facilitated a design that enabled pedestrians heading north across Exposition Boulevard to enter the north queuing area from the west and

exit from the east. Thus pedestrians already within the north queuing area were not blocked off as additional people entered from the south.

Based on the revised configuration, the Farmdale Report concludes that both queuing areas are adequately sized to accommodate pedestrian demand so that, importantly, no queuing occurs on the tracks.

**Q. The Farmdale Report shows three simulations, with the three different configurations of gates noted above. Please explain the differences among these configurations.**

A. The three different gate options that were studied are, two manual gates, four manual gates and one 8-foot automatic gate. The various opening configurations were tested to regulate the flow of pedestrian to the north queuing area.

**Q. The last pages of the Farmdale Report show a “Map Analysis” and some concluding observations. Please explain these conclusions.**

A. The “Map Analysis” shows us the density of pedestrian occupancy of the queuing areas, crosswalks, and sidewalks during the busiest time of day – just after 3:00 pm on a school day afternoon. The colors indicate that the densest portions of the queuing areas – those shown in yellow – will provide at least three square feet per pedestrian, a density that still provides adequate comfort and safety for waiting pedestrians. This is because when people are queuing or waiting to cross at a crosswalk, they will typically allow people to stand closer to them as they are stationary and because it is only expected to be for a short period of time.

Based on our simulations, with the revised configuration of the queuing areas and the crosswalk, all three gate options are effective in preventing queuing of pedestrians on the tracks.

**Q. Turning to the analysis of the proposed Expo Rail crossings in the vicinity of the Foshay Learning Center, please provide a general description of the work and analysis Legion America performed with respect to pedestrian traffic and pedestrian safety at this location.**

A. Legion America's work on this project followed on from the work at USC/Coliseum and at the Farmdale Crossing. It culminated in the preparation of a Pedestrian Analysis Report for Expo Authority, which was presented to Expo Authority's Board in December 2007. As I mentioned briefly before, the Foshay Learning Center Pedestrian Analysis Report analyzes pedestrian flows at three crossing points along the proposed Expo Rail Line – at the Harvard pedestrian underpass and the Western Avenue and Denker Avenue intersections with Exposition Boulevard.

**Q. Referring to the Foshay Learning Center Pedestrian Analysis Report, prepared in December 2007 ("Foshay Report"), please explain the Study Objectives presented at the third page of that report.**

A. The objective of the Foshay Report was to assess the performance of the intersections and crossings in the vicinity of the Foshay Learning Center. More specifically, Legion assessed the performance of the pedestrian underpass, the sidewalk capacity, the intersection of Western Avenue and Exposition Boulevard, and the intersection of Denker Avenue and Exposition Boulevard, in providing for safe



passage of pedestrians in the context of an operating Expo Rail Line. The next page of the report, entitled CAD (an acronym for Computer Aided Design), shows a drawing of the vicinity, with both westbound and eastbound rail platforms as proposed, as well as the Foshay Learning Center and the existing pedestrian underpass at Harvard Boulevard.

**Q. The next portion of the Foshay Report provides a set of data for the study that was conducted. Would you tell us what was significant about these data?**

A. The report adopts certain Model Assumptions regarding the exit profile from Foshay Learning Center. These assumptions were based on pedestrian counts and video footage of the existing pedestrian movements at the three crossings and anticipated boardings and alightings at the Western Avenue Station provided to us by Expo Authority.

When planning a pedestrian space, it is important to study the peak period of pedestrian demand so as to ensure that recommended safety measures account for the highest routine volume of pedestrians anticipated in the vicinity. According to the data Expo Authority provided us, the number of students observed from the time period of 3:20 PM to approximately 3:50 PM totaled 1,042 students. The demand across the three intersections during this period of time is not continuous.. The peak period of pedestrian demand begins to ramp up just after 3:20 PM, peaking at approximately 3:25 and declining steadily until about 3:35, from which point the demand declines at a more rapid rate. Approximately 800 students exit Foshay during the first 15 minutes of the study period.

The next pages of the Report show the routes of non-students, and then students. Although the bulk of the pedestrian traffic, particularly at peak demand, is students, the Foshay Report also accounts for the flow of non-student pedestrians, with the highest number of non-students (55) moving from north to south across Exposition Boulevard. The Report next shows the breakdown of the 1,042 students departing from Foshay by various routes and means, with 164 persons passing across the north and west legs of the Western Avenue crossing, 81 taking the east leg of that crossing, 244 using the Harvard pedestrian tunnel, and 167 crossing at Denker Avenue. The remainder find their way home without crossing the LRT right of way.

Operational Assumptions, listed next in the report, include a light rail cycle time that assumes a 5 minute peak-period headway in each direction with trains yielding to pedestrians and cars. Additionally, the Foshay Report incorporated assumptions regarding traffic signaling. For the Western Avenue North & South Crossing, the Foshay Report assumed a 10-second walk and 110-second stop (including an 18-second flashing “Don’t Walk” prompt). For the Western Avenue East & West Crossing, as well as the Denker Avenue West Crossing, the Foshay Report assumed a 10-second walk and a 110-second stop (including a 30-second flashing “Don’t Walk” prompt).

**Q. The next pages of the report detail three “Simulations” and three “Entity Positions” showing the key crossings in the proximity of Foshay Learning Center. Please explain what the simulations demonstrate.**

A. These pages show how the crossings would perform following the introduction of Expo Rail. The simulations show that, at the key crossing locations, pedestrian densities remain within safe levels of service during the peak after-school period (3:20pm - 4:20pm). However, as is to be expected, minor congestion occurs on the stairs leading to the pedestrian underpass and at the crosswalks when the peak of the students exit the school. For the most part, the sidewalks remain within Fruin LOS A and LOS B (Walkways).

**Q. The next page of the report is titled “Maps Explained” and provides a narrative regarding pedestrian density. Would you explain these density models?**

A. The “Maps Explained” page provides a color key that corresponds to density levels in a particular area over time. This study used Fruin Levels of Services. Different density levels, or Fruin LOS, exist for walkways, stairs, and queuing and are labeled according to density by a corresponding letter of the alphabet. For example, LOS C for Fruin LOS (Walkways) represents 15 to 25 square feet per person.

The color key represents the different Levels of Service. These were developed by John Fruin when working for the Port Authority of New York and New Jersey and relate to the amount of space available per person. He produced six bands, in terms of which it is generally accepted that LOS D and below is acceptable and represents an effective pedestrian solution. The color ranges are used to represent the different levels of service. Red areas are to be avoided and orange

areas suggest warning of high density levels. Colors in the range of blue to yellow are different ranges of experience, all of which are considered acceptable.

**Q. The last four pages of the report show a “Map Analysis” and some concluding observations. Would you tell us about these conclusions?**

A. The “Map Analysis” shows us the density of pedestrian occupancy of the stairs, sidewalks, and walkways during the busiest time of day – just after 3:20 pm on a school day afternoon. On the Map Analysis of the pedestrian underpass, the colors indicate that on the stairwell closest to Foshay Learning Center, LOS D (Stairs) is not exceeded and that LOS B is most commonly experienced. The conclusion that may be drawn from these data is that minor congestion occurs during the peak exit profile immediately after school on the stairs leading to the pedestrian underpass and at the crosswalks. However, even at peak demand, levels of congestion remain well within safe levels.

On the Map Analysis depicting the Western Avenue and Exposition Boulevard intersection, Fruin LOS C (Queuing) is not exceeded at the busiest corner. This allows for a range of at least 10 to 15 square feet per person, thus maintaining safe levels of pedestrian assembly. On the last Map Analysis, depicting the Denker Avenue and Exposition Boulevard intersection, Fruin LOS B (Queuing) and Fruin LOS D (Walkways) are not exceeded. Both Fruin LOS B (Queuing) and LOS D (Walkways) indicate manageable demand and density necessary to ensure pedestrian safety and freedom of movement.

Based on our simulations, I conclude that pedestrian densities will be within safe levels of service during the peak after school period (3:20 PM – 4:20 PM) in the

key locations relative to students departing from Foshay Learning Center. Although minor congestion does occur on the stairs leading to the pedestrian underpass and at the crosswalk due to the peak exit profile immediately after school, these are not dangerous conditions and for the most part, the sidewalks remain uncrowded, within the Fruin LOS A and LOS B.

**Q. Item H-9 in Expo Authority’s Supplemental Information Filing provides animated simulations of pedestrian movements in the vicinity of the Foshay Learning Center. Would you briefly describe these simulations and draw some conclusions from the results?**

A. Each of the five simulations show a different intersection or aspect of the area impacted by pedestrian movement originating from the Foshay Learning Center. The pedestrian simulation of the underpass (H-9.3) indicates that the capacity of the underpass can easily accommodate twice the number of students who use it today – currently approximately 40% of students crossing Exposition Boulevard at the peak time. The pedestrian simulations also indicate that the remaining 60% of the students crossing Exposition Boulevard use the Western Avenue and Denker Avenue crossings. These simulations reveal that all three options for crossing the Expo Rail alignment – the Harvard pedestrian underpass and the Western Avenue and Denker Avenue at-grade crossings – operate today at levels of pedestrian density well within their capacities. With the underpass open during peak periods, the pedestrian demand at the Western Avenue and Denker Avenue crossings is well within acceptable levels of safety.

**Q. Has Legion conducted a comparable analysis of pedestrian densities at the Western Avenue and Denker Avenue crossings on the assumption that the Harvard pedestrian underpass is closed at the peak school dismissal time?**

A. Yes, we have. That pedestrian simulation is presented in Power Point form as Attachment A to my present testimony, in a form very similar to Items H-7 and H-9 in Expo Authority's previously submitted Supplemental Information filing. What is most significant about this latest pedestrian simulation is that it confirms that even with closure of the Harvard pedestrian underpass at all times, including the peak school dismissal period, diverting the students who currently use the underpass to the Western Avenue and Denker Avenue crossings, pedestrian densities at Western Avenue still are safe and safe pedestrian densities also can still be achieved at Denker Avenue by widening the sidewalk by three feet for at least ten feet on either side of the crosswalk.

**Q. What general conclusion is appropriate from Legion's pedestrian simulation studies of the crossings in the vicinity of Foshay?**

A. My general conclusion is that continued reliance on the Harvard pedestrian underpass is not essential to the safety of Foshay students who cross the Expo Rail right-of-way providing that the sidewalk widths are increased in accordance with the recommendations in the report. Even with the Harvard underpass removed from service the crossings at Western and Denker Avenues can be made fully safe for pedestrians, from a traffic and capacity perspective, at all times of day or night.

**Q. Does this conclude your testimony?**

A. Yes, it does.