



Pennsylvania Department of Transportation  
 Engineering District 6-0  
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Name of Project:  
 Hollywood Casino  
 Submission: Traffic  
 Impact Study

Designer: Pennoni (Mr. Harry Laspee)

Submission Date: September 10, 2013

REVIEWER INFORMATION	COMMENTS	DESIGNER RESPONSE	RESOLUTION
Orth-Rodgers & Assoc. for Engineering District 6-0  DATE: October 3, 2013  Is a resubmission required?: YES			
1. General	A transportation Impact Study (TIS), prepared in accordance with Strike-of-letter 470-09-04 (Policies and Procedures for Transportation Impact Studies) must be submitted by the Applicant. The information submitted by the Applicant does not fully comply with PennDOT's TIS guidelines. A compliant TIS report will require vehicular/pedestrian counts at potentially impacted locations, additional trip generation/distribution methodology, existing/future capacity analysis and recommendations and conclusions. Below are components related to a TIS report (not limited to) that should be included when applicable		
	a) A transportation impact study must be signed and sealed by a professional engineer registered in Pennsylvania	The revised TIS is signed and sealed by a professional engineer on the cover page.	Resolved
	b) Include an executive summary	The TIS includes an Executive Summary on pages i-ix of the report.	Resolved
	c) All proposed driveways should be evaluated for capacity, sight distance and queuing	An evaluation of the capacity, sight distance and queuing at the proposed driveway locations is included in the Site Access/Parking and Future Traffic Conditions sections of the TIS.	Resolved
	d) Include detailed traffic circulation within the proposed site	The TIS includes a description of the site traffic circulation in the Site Access/Parking Section of the report.	Resolved
	e) Provide a traffic signal warrant analysis for any proposed traffic signal locations	Not applicable.	Resolved
	f) Provide crash data/history for critical intersections/roadway network. A Summary of the crash analysis can be included in the report, however, actual crash records should be included within the appendix with a confidentiality statement on the cover. It is recommended to separate the crash record appendix from the main TIS report.	A summary of the crash data analysis is provided in the report in Appendix E.	Resolved
	g) Traffic Signal and system permit plans must be included in the traffic impact study	All traffic signal plans and timing directives provided by the City of Philadelphia are included in the TIS in Appendix C. It should be noted that a signal permit plan was not provided by the City for the S. Broad Street and Pollock Street intersection. Additionally, traffic signal timings were obtained from field measurements at intersections where the field conditions do not match the permit plans.	Resolved
	h) Street view photographs and/or aerial photos of the study intersections are preferred	Aerial photographs of all study intersections are included in the TIS throughout the report.	Resolved
	i) The trips generated from other proposed developments that may impact the project site study area must also be included in the projected trip analysis	Not applicable. There are no programmed developments on record in the study area.	Resolved

	j) Include pedestrian distribution to/from venues and provide an access evaluation	Pedestrian volumes oriented to/from venues are included in Appendix A of the revised TIS. A pedestrian rate of 2% was assumed to account for pedestrians whose primary mode of transit is walking and also those utilizing public transportation that complete their trip on foot. The additional pedestrian volumes were distributed to the study area roadways and added to the existing pedestrian volumes for the Build conditions. A summary of the pedestrian distribution is included in the Trip Generation section of the report.	Resolved
	k) Include an analysis of pedestrian activity at the intersections within the project limits, including the Applicants proposed accesses, to determine if pedestrians are present. The determination if pedestrians are present must be based on pedestrian counts, a visual inspection of the site to determine if clearly defined walking paths are provided. The results of this analysis must be utilized to determine if and where pedestrian facilities must be provided.	The traffic volumes collected at the study area intersections include pedestrian counts. The level of service/capacity analysis includes the volume of pedestrians counted at each intersection. A summary of the existing pedestrian accommodations at each study intersection is included in the Existing Conditions Assessment section of the TIS. The site will generate pedestrian activity at the signalized intersections along Packer Avenue from Broad Street to 7th Street and on Darien Street from Packer Avenue to the Sports Complex Venues. Pedestrian upgrades are proposed at the signalized intersections on Packer Avenue shown on page vi of the Executive Summary.	Resolved
	l) Provide pedestrian capacity analysis following the 2010 HCM guidelines for the intersections that are found to be impacted by the increase of pedestrian traffic generated by the casino. Include mitigation improvements for those areas with high pedestrian traffic.	As discussed at the April 26, 2013 meeting for the Philadelphia Sports Complex and Casinos Traffic Studies, an assessment of pedestrian facilities should be provided in lieu of the capacity analysis. Although we anticipate moderate to low increases in pedestrian traffic, we are proposing pedestrian improvements as noted above. A summary of the existing and proposed pedestrian accommodations is included in the TIS.	Resolved
	m) Opening year analysis must be performed for the development. Future analysis must be performed for the horizon year, i.e. 5 years beyond opening year of the development when the first structure is in use and access is constructed to the state roadway. The report must be modified to reflect the opening year and horizon year analysis for the development	The previous TIS included an analysis of the opening year (2016) and horizon year (2021) as required by PennDOT. The TIS has been revised to include an analysis of the Phase 2 development plan. The revised TIS includes an analysis of the opening year (2016), Phase 2 (2021) and horizon year (2026) conditions. The Existing Conditions, No Build and Build capacity analysis worksheets are included in Appendices D, F, J and K.	Resolved
	n) <i>Queue analysis for all signalized intersection and for unsignalized left-turning lanes must be completed and stated in the report.</i>  There are many locations in which the 95th percentile queue length exceeds the available storage. Provide recommendation or justification as to why these queues cannot be mitigated.	<i>A queue analysis of all study intersections is included in the TIS. The queue capacity analysis worksheets are included in Appendix D, F, J and K.</i>  The queue analysis has been updated to reflect the revised analysis. At locations where the 95th percentile queue length exceeds existing storage lengths and the queue length is extended in the Build scenario, improvements have been identified to improve the queue lengths. Per PennDOT policy, at locations where the 95th percentile queue length exceeds existing storage lengths, but is not increased in the Build scenario, no improvements are required.	
	o) Auxiliary lane warrant analysis, in accordance with Strike-off-letter 470-08-07, must be included for the proposed conditions.	An auxiliary turn lane warrant analysis has been conducted for all proposed site access locations. A summary of the results of the warrant analysis is included in the Site Access/Parking section of the TIS and the worksheets are included in Appendix I.	Resolved
	p) Include gravity model (a graphic is preferred)	A gravity model with graphic is included in Appendix H of the revised TIS.	Resolved
	q) Do not use default values on the traffic analysis inputs (saturation flow rates, utilization rates, etc.). Where existing traffic and pedestrian data is collected, actual values should be used	The capacity analysis has been modified utilizing the Pennsylvania Default Values as recommended in PennDOT Publication 46.	Resolved
	r) A level of service Matrix per lane group must be provided. Including numerical delay value	A level of service matrix is provided in Appendix M of the TIS.	Resolved
	s) The site accesses must function at a minimum level of service D for Urban areas. Mitigation measures or restricted movements from deficient operations locations may be required to meet guidelines.	All site access intersections will operate at an overall level of service D or better for all design scenarios.	Resolved

	t) All HCS and/or Synchro analysis worksheets and electronic files must be included for review	All Synchro analysis worksheets are included in Appendices D, F, J and K. The electronic files will be included with this submission.	Resolved
	u) All calculations and methodology must also be included in the report to justify the analysis and results.	Calculations and methodology for all analysis are included in the appendices of the TIS.	Resolved
	v) The report should include conclusions and recommendations. Please note that the Developer/Applicant is responsible for mitigating all impact resulting from the proposed development, unless there is another project under construction that will provide mitigation	An Executive Summary including conclusions and recommendations is included in the TIS on pages i-ix of the report. All improvements required to mitigate the impacts of the proposed development are detailed in the Recommendations Section starting on page 44.	Resolved
	w) If the recommendations include the elimination of existing on-street metered parking spaces, a revenue loss evaluation should also be provided	Not applicable.	Resolved
	x) Include taxi and bus operation/circulation to/from the site.	Figure 3 and 4 of the report show the taxi/bus circulation respectively.	Resolved
2. Trip Gen/Dist.	<p><i>Trip rate (trip per gaming positions) should be based on the average of no less than three existing casinos of comparable design and location. The three casinos listed below are valid examples of existing casinos location in metropolitan areas. If trip rates are based on a different methodology please provide justification. a) Sugarhouse Casino (Philadelphia, PA), b) Casino St. Charles (St. Louis, MO), c) Hollywood Casino (Columbus, OH)</i></p> <p>Trip generation rates for the Casino seem in line with other available data. However, additional justification should be provided for trip generation of the additional on-site amenities. The assumption that the bar, restaurant, retail, and multi-purpose space will not generate additional trips seems erroneous.</p>	<p><i>The trip generation rate has been revised to be an average of three existing casinos as requested. The revised rate is based on traffic volumes obtained at the SugarHouse Casino (Philadelphia, PA), Rivers Casino (Pittsburgh, PA) and Casino St. Charles (St. Louis, MO). The traffic volumes collected at each casino site are included in Appendix H of the revised TIS along with summary of the trip generation rate calculations. The analysis has been revised with the updated trip generation rate.</i></p> <p>The proposed bar, restaurant, retail and multipurpose space are ancillary uses to the proposed casino. At the time the counts were conducted for trip generation, the Rivers Casino included restaurants, bars, a 10,000 sf meeting room and a 1,000 seat amphitheater; Sugar House Casino included restaurants and bars; and the Casino St Charles included restaurants, bars, a retail shop, and a video arcade. Therefore, the traffic volumes for these ancillary uses are already included within the trip generation calculations for the proposed casino.</p>	
3. Phila. Gaming Ad.	The "Executive Summary of the Interim Report of Findings" by the Philadelphia Gaming Advisory Task Force documents should be utilized as a guide to develop trip methodologies. Data is provided for casino visitation patterns by time of day (page 15, table 3) and mode of arrival splits (page 16, graph 2). All analysis, calculations and back up data must be included in the report.	Data contained in the Interim Report of Findings by the Philadelphia Gaming Advisory Task Force was utilized as noted on page 33 of the TIS. However, since the new trip generation rate calculated for this analysis was assumed to exclude multimodal trips, no multimodal trip reduction was taken.	Resolved
4. Time of day requirem	The Philadelphia Gaming Task Force document states that a casino's Friday visitation peak time is different from the Friday rush hour time (commuter peak). The TIS reports should analysis both critical weekday and weekend peak time periods. Therefore, the following should be analyzed: a) Friday evening commuter peak hours (between 4-6PM, all non-event intersections), b) Friday evening with pre-Phillies event peak hour (all intersections), c) Friday Casino peak hour (between 7-10PM, Only for intersections on Packer Avenue from S. Broad St. to Front St. and intersections on S. Front St. at the I-95 ramps), d) Saturday casino peak hour (Only for intersections on Packer Avenue from S. Broad St. to S. Front St. and intersections on S. Front Street at the I-95 ramps)	The TIS has been revised to include an analysis of the requested peak hours. The level of service matrix included in Appendix M of the TIS has been revised to include the additional peak hours.	Resolved
Traffic Impact Study 1.	The following are a list of intersections that the applicant should include in the study area. These locations are based on the Langan study area from the "Philadelphia Sports Complex Parking and Traffic Management Plan" report, September 21, 2010. The applicant is responsible to use this study as the basis for their evaluation. 1) Penrose Avenue and Pattison Avenue 2) Pattison Avenue and S. Broad Street (Southbound) 3) Pattison Avenue and S. Broad Street (Northbound) 4) Pattison Avenue and S. 11th Street (Friday scenario with event only) 5) Pattison Avenue and S. Darien Street 6) Pattison Avenue and S. 7th Street 7) S. Broad Street (NB & SB) and Packer Avenue 8) S. Broad Street (NB & SB) and Pollock Street 9) Packer Avenue and S. 10th Street 10) Packer Avenue and S. Darien Street/I-76 Eastbound Off/On Ramps 11) Packer Avenue and S. 7th Street 12) Packer Avenue and S. Front Street 13) S. Front Street and I-76 Eastbound On Ramp (unsignalized intersection) 14) S. Front Street and I-76 Westbound Off Ramps/I-95 Southbound On Ramp 15) S. Front Street and I-95 (SB Off/NB On Ramps)/Dunkin Donuts Driveway 16) S. Broad Street (NB) and S. 11th Street (Friday Scenario with event only) 17) S. Broad Street (SB) and I-95 SB Off Ramp 18) S. Broad Street (NB) and I-95 SB On Ramp 19) W. Oregon Avenue and S. Broad Street 20) I-95 SB and Exit 17 Off Ramp (Broad Street/Pattison Avenue) - Unsignalized Intersection 21) I-95 SB Off Ramp (Exit 19) and WB Packer Avenue - Unsignalized Merge Condition.	The study area has been expanded to include the requested intersections. The TIS has been revised to incorporate the expanded study area.	Resolved

2	Applicant will need to coordinate their analysis with the existing operation plan for the sports complex facilities. For the analysis of all event periods, the TIS shall include details of the current operation plan. If any proposed changes to the plan are recommended, it shall be clearly noted in the TIS. All information related to the existing operation plan for the sports complex facilities can be obtained from the Philadelphia Streets Department by contacting the Chief Traffic and Street Lighting Engineer.	The TIS does not propose any changes to the traffic management plan. Traffic signal timings modifications and equipment upgrades are recommended to mitigate the impact of the proposed development as described in the Recommendations Section.	Resolved
3	Provide detailed pedestrian access information to/from each of the existing Sports Complex venues to the applicant's site.	Pedestrian access information is provided in the TIS.	Resolved
4	The traffic study shall use the Sports Complex boundaries as indicated in the Langan Report (plus the four intersections on W. Oregon Avenue) for the study area. This previous report should also be sure to integrate the site's trip generation/distribution into the existing traffic management strategy plan (Langan Report dated September 21, 2010).	The study area has been expanded to include the requested intersections. The generation/trip distribution was prepared based on an evaluation of the existing traffic pattern, traffic management operations, a gravity model, the anticipated characteristics of the development generated site traffic and the propose site accesses. A discussion of the site trip distribution is included in the Trip Generation section of the TIS.	Resolved
5	The TIS report was only completed for Phase I of the master plan. Please include all phases of the project to review the ultimate (full build out) condition of the project site, plus the 5 year horizon condition.	As previously stated, the TIS has been revised to include an Opening Year 2016 (Phase 1) and Phase 2 2021 and Horizon Year 2026 analysis as requested.	Resolved
6	Only some of the existing signal permits were provided for review. Please include all existing signal permits in the study area for review.	As previously stated, all existing signal permit plans provided by the City of Philadelphia are included in the TIS in Appendix C. It should be noted that a signal permit plan was not provided by the City for the S. Broad Street and Pollock Street intersection. Additionally, traffic signal timings were obtained from field measurements at intersections where the field conditions so not match the permit plans.	Resolved
7	The LOS value for the unsignalized intersection of S. Front Street and I-76 EB On-Ramp was provided; however, the capacity analysis output was not shown. Please provide the capacity analysis output worksheet for this and all study intersections for review.	The capacity/LOS analysis worksheets for all study intersections are included in Appendices D, F, J and K the revised TIS.	Resolved
<b>Additional TIS Comments</b>			
8	A press article in late September indicated the applicant would contribute to a new I-76 westbound on-ramp from 7th Street. Please include a discussion of this proposed new ramp facility in the TIS narrative. Also provide an appendix in the report that describes the operations of this facility and its effect on local traffic based on all information and analysis you have performed to date. If this casino applicant is selected and granted a permit for this site, additional analysis will be required for a proposed ramp access to a freeway including a Point of Access Study. Coordination with all stakeholders including: The Port Authority, The City of Philadelphia, The FHWA and PennDOT will be required to implement this proposal.	The proposed I-76 Westbound on ramp at 7th Street has been added to the TIS as a recommended improvement. The report and analysis has been revised to reflect the proposed ramp. A sketch plan of the proposed ramp and an analysis of the weave condition can be found in Appendix P of the TIS.	
9	On page 40, for the 2016 Phase 1 Opening Day Saturday Evening Casino Peak, it states that the intersection degrades from 17.4 to 28.5 seconds of delay and does not exceed PennDOT's 10 second threshold, however it does. (28.5-17.4) is greater than 10 seconds. Please revise comment.	Page 40 of the TIS has been revised as directed.	
10	Please note the proposed improvements include restriping 7th street at both casino access points. This would require approval from the City of Philadelphia.	Noted. A statement that all proposed improvements require approval for the City of Philadelphia has been added to the report.	
11	Please note the proposed improvements include restriping the I-76 EB off-ramp to provide a left turn lane and a left turn/through lane. Can the existing shoulder accommodate traffic? Will this meet design criteria for shoulder width on an interstate off-ramp? Is there an existing break over between the travel lane and shoulder? If so, would traffic be traveling along this break over? Widening may be necessary.	The proposed improvement for the I-76 EB Off Ramp at Packer Avenue includes widening the approach and restriping to provide a separate left turn lane, a shared left/through lane and a separate channelized right turn lane. Additional overhead signing will also be provided.	

12	<p>Synchro and traffic modeling comments are provided below. If revisions to the models are made and reduce capacity based on the guidelines, please provide mitigation options:</p> <p>a) In the Synchro model, at the intersection of Penrose Avenue and Pattison Avenue, the EB approach should only be a right turn lane. The WB approach should be dual left turns, a left turn/through lane, and a right turn lane. The SB approach should be a left turn lane, a through lane, and a through/right turn lane.</p> <p>b) In the Synchro model, at the intersection of Packer Avenue and Broad Street NB, the NB approach should have an angle right/right turn lane instead of just a right turn lane.</p> <p>c) In the Synchro model, at the intersection of Broad Street and Pollock Avenue, the NB approach should only be two through lanes. The right turn lane for the I-76 on-ramp is downstream of the signal.</p> <p>d) In the Synchro model, at the intersection of Packer Avenue and 10th Street, the EB approach is striped as a left turn lane, a through lane, and a through/right turn lane. The SB approach should be a left turn/through lane and a right turn lane? Please review and revise if necessary.</p> <p>e) In the Synchro model, at the intersection of Front Street and I-76 WB off-ramp/I-95 SB on-ramp, should the EB approach be a left turn/through lane, a through lane, and a right turn lane? Please review and revise if necessary.</p> <p>f) In the Synchro model, at the intersection of Broad Street NB and the I-95 off-ramp, should the WB approach be two through lanes and a right turn lane? Please review and revise if necessary.</p> <p>g) In the Synchro model, at the intersection of Broad Street NB and the I-95 on-ramp, should the EB approach should have two through lanes that each go to different roadways? Please revise if necessary.</p> <p>h) It appears that HCM freeway ramp analysis was utilized at the merge locations at I-95 NB off-ramp and Broad Street NB and I-95 NB off-ramp and Packer Avenue. This modeling/analysis is appropriate only on the freeway segment not on the adjacent collector roadways. This seems to be the wrong analysis for these locations, please justify if not.</p>	<p>Per discussions with the PennDOT reviewer, the synchro model has been modified as requested where appropriate. The report has been updated to reflected the revised analysis. Per <i>Highway Capacity Manual 2010, Chapter 13 Freeway Merge and Diverge Segments</i>, "When a ramp connection to a surface facility (such as a multilane highway) or a C-D roadway is designed for high-speed merging or diverging without control, it may be classified as a ramp-freeway junction for the purpose of analysis."</p>	
13	<p>Gaming facilities may qualify for supplemental signs under the "PennDOT's Guidelines for Casino Signing" program.</p>	<p>Noted.</p>	