Pennsylvania Department of Transportation
Engineering District 6-0
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Name of Project:
Market8
Submission: Traffic Impact Study

Designer: Pennoni (Mr. James Markham)

Submission Date: September 23, 2013

REVIEWER INFORMATION	COMMENTS	DESIGNER RESPONSE	RESOLUTION
Orth-Rodgers & Assoc. for Engineering District 6-0 DATE: October 1, 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	Pennoni's final MARKET8 TIS has been signed & sealed by Professional Engineers registered in the Commonwealth of Pennsylvania.	Resolved
	b) Include an executive summary	An Executive Summary has been included.	Resolved
	c) All proposed driveways should be evaluated for capacity, sight distance and queuing	All proposed driveways, namely Market8 Boulevard intersections with South 8th Street and South 9th Street have been evaluated for capacity, sight distance and queuing where applicable.	Resolved
	d) Include detailed traffic circulation within the proposed site	Detailed circulation within the proposed site was evaluated using VISSIM for "worst case" traffic conditions and the results of this evaluation have been incorporated into the MARKET8 TIS.	Resolved
	e) Provide a traffic signal warrant analysis for any proposed traffic signal locations	No proposed traffic signals and subsequent warrant analyses are recommended as part of the expanded study area.	N/A

	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.	Crash data/history for the study area intersections and roadway network were requested from the City of Philadelphia and PennDOT. This information has been provided in the MARKET8 TIS (see Appendix G) and summarized under the "Existing Traffic Conditions" section of the report.	Resolved
	g) Traffic Signal and system permit plans must be included in the traffic impact study	Traffic Signal and System Permit plans are included in Appendix A of the MARKET8 TIS.	Resolved
	h) Street view photographs and/or aerial photos of the study intersections are preferred	Street view photographs of the study intersections have been in included in Appendix C of the MARKET8 TIS.	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	No "other" planned (approved) developments impacting the MARKET8 study area are incorporated into the revised TIS.	Resolved
	j) Include pedestrian distribution to/from venues and provide an access evaluation	Actual pedestrian distribution patterns have been identified by virtue of the intersection turning movement counts within the study area. A walkability audit was conducted by Pennoni to/from adjacent parking venues, providing short-term recommendations to enhance existing pedestrian safety and accessibility. The summary can be found on Page 12 and supporting documentation in Appendix H. This walkability audit, based on Federal "Safe Routes To School" program criteria, generally found the pedestrian environment in the vicinity of the site (and to/from various parking venues) to be in "pretty good" condition.	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.	k) Pedestrian counts and capacity analyses have been incorporated into all Synchro models and 2010 Highway Capacity Manual (HCM) analyses. Pedestrian counts can be found in Appendix D. Pedestrian LOS summaries can be found in Appendix H. All pedestrian levels of service were found to be consistent with central business district operations.	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.	See responses to the previous 2 comments.	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	Opening, Future and Horizon Year analyses (without and with mitigation) have been performed for MARKET8 and are included in Appendices L and M.	Resolved
	n) Queue analysis for all signalized intersection and for unsignalized left-turning lanes must be completed and stated in the report.	Queue analyses for all signalized intersections have been incorporated into the study.	Resolved.

	o) Auxiliary lane warrant analysis, in accordance with Strike-off-letter 470-08-07, must be included for the proposed conditions.	Auxiliary lane warrant analyses, in accordance with Strike-Off Letter 470-08-07 have been included in Appendix N of MARKET8 TIS and summarized in the report. While Right-Turn Auxiliary lanes are warranted for the MARKET8 entry and the south approach at S 9th Street/Market, Pennoni only recommends the latter, as S 8th Street has an 8-foot shoulder for this one-way entrance will eliminate any side friction that might otherwise impact ingress operations. Levels of Service are only nominally improved with the inclusion of an exclusive right-turn lane along S 8th Street. In addition, for the Market Blvd ingress, we an exclusive lane: • (-) Does not significantly improve LOS "A" results versus w/o lane; • (-) Creates a "jog" in sidewalk that is not desirable in CBD locales; • (-) Increases walking distance (and time) to cross S 8th Street at Market; and • (-) Results in potential utility impacts over subway	Resolved
	p) Include gravity model (a graphic is preferred)	A gravity model to confirm projected trip distribution to/from the MARKET8 site has been included in the report. The summary can be found on Page 18 and supporting documentation in Appendix K. This gravity model confirmed Pennoni's original (February 2013) Trip Distribution with slight modifications as a result of the expanded study area. GPS-based directions to/from the MARKET8 site were also utilized to verify model assumptions.	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	Actual saturation flow rates, Peak Hour Factors and pedestrian data has been included for all MARKET8 traffic analyses as reflected in our Synchro models and HCS calculations. See following response to comment 'r'.	Resolved
	r) A level of service Matrix per lane group must be provided. Including numerical delay value	Level-of-Service matrix tables have been included in Tables 8 and 9 of the MARKET8 TIS. These tables show that all study intersections under the BUILD scenarios (with and without mitigation) fall within PennDOT delay thresholds and do not degrade existing levels of service.	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.	Both MARKET8 site driveways function at LOS B or better for all time periods analyzed.	Resolved
	t) All HCS and/or Synchro analysis worksheets and electronic files must be included for review	All electronic HCS and Synchro files have been included on a CDRom as part of the MARKET8 TIS Appendices.	Resolved
	u) All calculations and methodology must also be included in the report to justify the analysis and results.	Relevant technical back-up information is included in the Appendices of the MARKET8 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	The MARKET8 TIS includes all Findings, Recommendations and Conclusions associated with projected development traffic within the defined study area.	Resolved

	w) If the recommendations include the elimination of existing on-street metered parking spaces, a revenue loss evaluation should also be provided	The recommendations included in the report eliminate three (3) metered parking spaces on the east side of 9th Street between the MARKET8 exit and Market Street and three (3) metered spaces on the west side of S 8th Street between Market Street and Market8 Boulevard. As the City of Philadelphia recently removed parking along S 8th Street from Market to Randstead, the approximate "revenue loss" for the three S 9th Street metered spaces is approximately $300/week or $15,600/year (See Appendix P – Relevant Correspondence).	Resolved
	x) Include taxi and bus operation/circulation to/from the site.	Taxi and bus circulation to/from the MARKET8 site will generally follow the same patterns as determined by the aforementioned gravity model. To be conservative in our impact analyses, Pennoni did not remove the estimated 11% of taxis from our calculation of "new" trips, despite the fact that these vehicles are generally included within the existing CBD traffic stream. The casino operator has indicated that MARKET8 is anticipated to generate very little charter bus activity. However, charter buses could utilize the Market Street bus "pull-off" in front of MARKET8 as needed and then park at the Callowhill Bus Center (114 Callowhill Street) until patrons are ready for pick-up.	Resolved
2. Trip Gen/Dist.	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)	Driveway counts were conducted at the SugarHouse Casino (Philadelphia, PA) and the Hollywood Casino (Columbus, OH) during June 28-29, 2013. Casino St. Charles' trip generation rates were reference from an ITE Journal article, "Gaming Casino Traffic" by Paul Box and William Buntle (March 1998). Since the Columbus and St. Louis venues are significantly removed from the CBD's, Pennoni utilized the local, SugarHouse trip generation rates as the "basis" for our MARKET8 analyses. These rates were generally LOWER than the average of the aforementioned casino's (see TIS Table 4); with Pennoni assuming multi-modal trip generation (i.e., mode of arrival) reductions as per the Philadelphia Gaming Advisory Task Force's "Executive Summary of the Interim Report of Findings" as suggested by ORA.	Resolved
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.	Agreed. See response to ORA Comment #3 above. (should say #2 above)	Resolved

4. Time of day requirement	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), b) Friday Casino peak hour (between 7-10PM), c) Saturday casino peak hour	The revised MARKET8 TIS is based on the following "peak hour" times between those intervals noted below as suggested by ORA: • Friday Commuter Peak (between 4 - 6 PM); and • Friday Casino Peak (between 7 - 10 PM). The selection of the following Saturday peak hour intervals were based on historical and empirical data from internet research and coin data from similar facilities: • Saturday Casino Peak (between 6 - 9 PM).	Resolved
Traffic Impact Study 1.	In addition to the 6 intersections included in the initial TIS, the applicant should also include in the study (due to their proximity to the site and potential impacts) those additional 33 intersections listed in our comment letter dated April 5, 2013.	Pennoni has expanded the study area to include the 39 intersections suggested by ORA.	Resolved
2	All intersection analyses should include actual pedestrian movements and not the default values provided in the capacity analysis software.	Actual pedestrian movements have been included in the intersection analyses with no remarkable adverse impacts indicated. The pedestrian count data is included in Appendix D.	Resolved
3	As shown on the site plan provided with the TIS, it appears the site provides a single ingress access (on 8th Street) and a single egress onto 9th Street. Please provide further detail on how this access plan accommodates pick up/drop off operations for taxis, valet, and bus service. Additionally, provide details on vehicular accessibility for on-site deliveries and for when the ingress or egress point is blocked by an incident.	Taxi, limo and SEPTA bus service pick-up/drop-off will be in the "front" of the MARKET8 Casino along Market Street between 8th and 9th Streets (See INTRODUCTION, FIGURE 1). The existing SEPTA bus stop currently exists at the SW corner of Market Street at 8th Street and will remain; with the inclusion of proposed pull-off. The Taxi/Limo pull-off will be closer to the SE corner of Market Street at 9th Street. All valet parking "drop-off" will occur within the site along Market8 Boulevard, with accommodation for limo/taxi drop-off during inclement weather. Valet "pick-up" will occur one level below street-level internal to the facility. Also, the casino operator has indicated that MARKET8 is anticipated to generate very little charter bus activity. However, charter buses could utilize the Market Street bus "pull-off" in front of MARKET8 as needed and then park at the Callowhill Bus Center (114 Callowhill Street) until patrons are ready for pick-up. Market8 Boulevard is "multi-laned" and should rarely be blocked, even by an "incident". However, should such an incident occur, to block either egress or ingress to the facility, vehicular (e.g., emergency vehicles) access can be provided via the opposing access point temporarily until the blockage is cleared. Finally, on-site deliveries are handled at the multi-bay loading area, which is separate and distinct access from S 8th Street ingress traffic. Stopped delivery trucks will not cause any issue for visitors to the entertainment complex.	Resolved

4	In the appendix of the report the capacity analysis output indicates a default peak hour factor (PHF) value of 0.92 was used for all approaches. Use actual PHF values (per lane group) from the count data as opposed to the default Synchro value.	Actual PHFs were used for all TIS Synchro analyses. PHFs were developed from turning movement counts which are included in Appendix D.	Resolved
5	It appears that the proposed parking facility does not fully provide the required parking spaces for the site. However the report indicated sufficient parking spaces are available at existing parking garages/lots. Identify the parking garages/lots that would be most often utilized for over flow parking in the vicinity of the site. In addition, please note if the applicant proposes to provide parking management services using smart parking technology such as smart phone messaging, GPS applications, VMS signs, etc.	The adjacent parking facilities most likely to be utilized by MARKET8 patrons not using the on-site parking include 733 Chestnut Street (owned by MARKET8). In addition, MARKET8 has secured 980 parking spaces for "as needed" use by patrons and/or casino complex employees at the following Market East locations: o E-Z Park (211 N 9th St and 912-916 Arch St) o Park Safe System (618 Market St) o Operator TBD (615 Chestnut St) o LAZ Parking (107 S 10th St) The proposed underground parking facility for MARKET8 will utilize "smart" parking management technology to identify "real time" parking availability and utilization in addition to "smart" phone messaging and CCTV for security.	Resolved
6	Identify any removal of public parking spaces and loading zones. If applicable provide the net revenue loss due to the reduction of existing metered parking spaces.	The recommendations included in the report eliminate three (3) metered parking spaces on the east side of 9th Street between the MARKET8 exit and Market Street and three (3) metered spaces on the west side of S 8th Street between Market Street and Market8 Boulevard. As the City of Philadelphia recently removed parking along S 8th Street from Market to Randstead, the approximate "revenue loss" for the three S 9th Street metered spaces is approximately $300/week or $15,600/year (See Appendix P – Relevant Correspondence).	Resolved
7	Although pedestrian crashes were provided, the leading pedestrian crash patterns were not identified. When applicable, please identify and provide pedestrian crash mitigation plan. (i.e. APS, ramps, pavement marking, etc.).	Crash data requested and provided by the City of Philadelphia and PennDOT does not break-down "causes" of accidents in specific detail – as might an "actual" accident report. That said, the walking environment in downtown Philadelphia is generally "pleasant" and typical of CBD accessibility. Save for an occasional "jaywalker" and pedestrians who cross during the "Don't Walk" portion of the pedestrian phase, any ped/vehicle accidents that occurred over the last 5 years were generally the result of "driver error". A summary of the Crash Data and our analysis is included in the TIS (see Appendix G) and short-term mitigation measures provided as part of the aforementioned walkability audit performed by Pennoni engineers (Appendix H).	Resolved

8	The study indicates that parking facilities adjacent to the proposed casino site would be able to support the parking needs generated by the casino patrons. The report must identify the location of the parking facilities, available parking spaces and verify that pedestrian accessible connectivity to/from the casino site is available. Please note that all pedestrian routes must be accessible and in compliance with the most current ADA regulations.	There are currently in excess of 2,800 parking spaces (within a 5-minute walk of the site) available after 5:00 PM on an average Friday and after 6:00 PM on an average Saturday. In addition, MARKET8 has secured 980 parking spaces for "as needed" use by patrons and/or casino complex employees at the following Market East locations: o E-Z Park (211 N 9th St and 912-916 Arch St) o Park Safe System (618 Market St) o Operator TBD (615 Chestnut St) o LAZ Parking (107 S 10th St) Combined with the 1000 on-site casino complex valet parking spaces, 340 "casino only" parking spaces at 733 Chestnut Street and the aforementioned 980 spaces controlled by MEA, the proposed entertainment complex will be able to accommodate over 4,000 parked vehicles on an average Friday or Saturday evening; with over 2300 of these dedicated to casino patrons and/or employees. Pennoni performed a detailed walking audit of the surrounding roadways around the (5-minute walking) perimeter of the site and found the routes to be "pretty good" when grading those factors in accordance with those outlined in the Federal government's Safe Routes to School program. See the summary on Page 12 of the TIS and supporting documentation in Appendix H.	Resolved
9	The study indicates a high distribution of traffic to and from I-676. The applicant should review the existing corridors connection to I-676, including an evaluation of impact on existing traffic signal systems. Any proposed changes along these key pathways to and from I-676 shall be clearly identified.	A gravity model to confirm projected trip distribution to/from the MARKET8 site has been included in the report (see Appendix K). This gravity model confirmed Pennoni's original (February 2013) Trip Distribution with slight modifications as a result of the expanded study area. Pennoni engineers also verified these "typical" (distribution) routes by examining a number of different internet-based GPS routing tools (e.g., Google Maps, MapQuest, smartphone mapping apps, etc.).	Resolved

Additional TIS Comments			
10	The study indicates excessive queuing at several signalized intersections. Please provide recommended measures to reduce these queues.	Pennoni reviewed the queuing results for all study intersections and though there are a handful of intersections not immediately adjacent to the site which experience increase in queues (i.e., delay) all intersections within the study area - post mitigation - are within PennDOT's 10-second LOS threshold. Any queue increases at these study intersections are generally in the range of 1 to 4 vehicles in length and, accordinging to our calibrate Synchro model, do not create any operational problems. While the development does result in some increased queues on Market Street approaches, these queues are manageable and do not spillback to adjacent intersections. It should be noted that study area queues could generally be further mitigated along Market Street under future build conditions with an optimization of offsets along the Market Street corridor.	
11	Recommendations were given to provide mitigation at the site or intersections adjacent to the site by updating signal timing. Some intersections not adjacent to the site property show lower LOS in the build condition than the no build conditions. Why are signal timing improvements not recommended for these intersections. To name a few: Race St/9th Street **(<4 sec increase in vehicle delay)** Chestnut St/8th Street **(2.0 sec increase in vehicle delay)** Chestnut St/7th Street **(7.5 sec increase in vehicle delay)** Arch St/9th Street **(4.4 sec increase in vehicle delay)** Walnut St/9th Street **(0.2 sec increase in vehicle delay)**	As noted above, although some off site intersection do experience LOS drop, the increase in vehicle delay is less PennDOT's 10 second threshold requiring mitigation. The LOS drops are due to minor increases in vehicle delay at intersections which are operating near the delay threshold for that particular LOS. See overall intersection vehicle delay increases for each of the intersections identified in the comment. **(see notes in comment).** **Pennoni would recommend a post-development study to analyze actual casino complex trip generation and traffic operations approximately 6 months after opening; addressing any operational issues.**	
12	Gaming facilities may qualify for supplemental signs under the "PennDOT's Guidelines for Casino Signing" program.	Agreed. Pennoni will advise MARKET8 of potential supplemental signing to enhance trailblazing along major ingress routes should a casino license be awarded and design of the facility commences.	