

APPENDIX G
TRAFFIC OPERATIONS STUDIES



MEMORANDUM

Date: September 25, 2014
To: Arcadia Development Company
From: Brian Jackson
Subject: **Traffic Operations Study for the Arcadia Evergreen Circle Project in San Jose, CA**

Hexagon Transportation Consultants, Inc. has completed a traffic operations study for the Arcadia Evergreen Circle mixed-use project in the Evergreen area of San Jose, California. The approximately 66-acre project site is part of a larger 81-acre vacant piece of land located in the southwest quadrant of Capitol Expressway and Quimby Road. The mixed-use project would include residential, retail and office development. Main access to the site would be provided via Capitol Expressway where the proposed retail and office uses would be located, with secondary access provided via Quimby Road where the residential development would be located.

The entire 81-acre site is approved (i.e., has environmental clearance) for 344,000 s.f. of commercial uses, 217 high-density residential units, and athletic fields (on 15 acres) to be used for either softball, little league or soccer. This level of site development was evaluated in the 2008 traffic study prepared for the Evergreen East Hills Development (EEHD) Policy. This traffic operations study prepared for the Evergreen Circle mixed-use project compares the project to the amount of site development that has already received approval, as outlined in the EEHD Policy. The currently proposed Evergreen Circle project is proposing 344,000 s.f. of retail uses, 5,000 s.f. of office space, and 250 high-density residential units. For the purpose of this traffic study, trips generated by the four softball fields also were included as part of the project trip generation estimates.

The Arcadia Softball Complex project, which would front Quimby Road and accounts for approximately 15 acres, would include constructing four softball fields and a centrally located restroom and concession building. Softball league play would occur between 5:00 PM and 11:00 PM on weekdays, with a maximum attendance of less than 200 people. An estimated maximum attendance of up to 400 people would occur on weekends. Two separate parking lots would provide a total of 244 parking spaces. Main access to the softball complex would be provided via Quimby Road, with secondary access provided internal to the Evergreen Circle site via Capitol Expressway.

Development of the entire 81-acre site would include new intersections on Capitol Expressway and Quimby Road. The need for signalization of these intersections was assessed based on the Peak Hour Volume Warrant (Warrant 3) described in the *Manual on Uniform Traffic Control Devices (MUTCD 2010 Edition, Part 4)*. The analysis evaluated pedestrian and bicycle access and on-site circulation, particularly the connections between the various land uses being proposed.

The purpose of this traffic operations study is to: 1) Identify any site access or on-site circulation issues that would occur due to buildout of the 81-acre site, and 2) Compare the currently proposed project to the amount of development that has already been approved for the 81-acre site. This study is intended to satisfy CEQA requirements and is to be presented to the City of San Jose in coordination with submittal of the Planned Development (PD) Permit for the Arcadia Evergreen Circle project.



Trip Generation Estimates – Approved Development

As previously described, the entire 81-acre site has been approved for 344,000 s.f. of commercial uses, 217 residential units, and athletic fields. Based on the City of San Jose and ITE trip generation rates, and after applying the applicable trip reductions, buildout of the entire site would generate 17,231 new daily vehicle trips, with 758 new trips occurring during the AM peak hour and 1,724 new trips occurring during the PM peak hour. Using the inbound/outbound splits recommended by the City of San Jose, future development of the entire site would produce 448 new inbound and 310 new outbound trips during the AM peak hour, and 891 new inbound and 833 new outbound trips during the PM peak hour (see Table 1).

Table 1
Trip Generation Estimates – Approved Development

Land Use	Size	Daily Rate /a/	Daily Trips	AM Peak Hour			PM Peak Hour				
				Pk-Hr Rate /a/	In	Out	Total	Pk-Hr Rate /a/	In	Out	Total
Proposed Uses											
Arcadia Retail /b/	200 ksf	70.0	14,000	2.80	336	224	560	7.00	700	700	1,400
Additional Regional Retail /b/	144 ksf	50.0	7,200	2.00	202	86	288	4.50	324	324	648
High Density Residential /c/	217 du	7.5	1,628	0.75	57	106	163	0.75	106	57	163
Softball Fields /d/	4 fields	71.3	285	1.12	3	2	5	17.70	47	24	71
Gross Trips:			23,113		598	418	1,016		1,177	1,105	2,282
Trip Reductions											
Mixed-Use Reduction /e/			(488)		(17)	(32)	(49)		(32)	(17)	(49)
Transit Reduction /f/			(33)		(1)	(2)	(3)		(2)	(1)	(3)
Pass-By Reduction /g/			(5,361)		(132)	(74)	(206)		(252)	(254)	(506)
Net Trips:			17,231		448	310	758		891	833	1,724

Notes:

/a/ Rate per 1,000 SF for retail; per DU for residential; per field for softball fields.

/b/ "Community Shopping" and "Regional Shopping" CSJ rates used. (*San Jose Traffic Impact Analysis Handbook*, 2009)

/c/ "Single Family Attached" CSJ rates used. (*San Jose Traffic Impact Analysis Handbook*, 2009)

/d/ Trip rates for softball fields not available so "Soccer Complex" rates used. (*ITE Trip Generation*, 9th Edition, 2012)

/e/ A 15% residential/retail mixed-use trip reduction was applied to the project per the Santa Clara VTA TIA Guidelines, March 2009. The 15% trip reduction was first applied to the smaller trip generator (residential). The same number of trips were then subtracted from the larger trip generator (retail) to account for both trip ends.

/f/ A 2% transit reduction was applied to the residential component of the project since the residential development would be located within 2,000 feet of a Major Bus Stop. (Santa Clara VTA TIA Guidelines, March 2009)

/g/ A pass-by trip reduction of 25% (standard for the City of San Jose) was applied to the retail component of the project. The reduction was applied to the net retail project trips after applying the transit and mixed-use reductions.

Note that while pass-by trips represent a trip reduction on the surrounding roadway network, these vehicle trips already on the roadway network are still considered new trips at the site driveways.

Softball Field Trip Generation

Published trip generation rates for softball fields are not available. For this reason, trip rates for Soccer Complex (ITE Land Use 488) were used because the two uses are comparable. Soccer teams and softball teams have a similar number of players on a team roster, and both games typically last two hours or less. As previously described, league play would occur between 5:00 PM and 11:00 PM on weekdays, with a maximum attendance of less than 200 people. An estimated maximum attendance of up to 400 people would occur on weekends. The difference in attendance can be attributed to a greater number of



spectators on the weekends than during the week. It is anticipated that the number of spectators during the week would be relatively low.

Trip Distribution Assumptions under Approved Conditions

Since the potential future development of the entire site would involve providing full access via both Capitol Expressway and Quimby Road, site-generated traffic would be split between these two new intersections. Based on existing travel patterns on the surrounding roadway system, the relative locations of complementary land uses in the area, and the distribution of the proposed land uses on the site, it was estimated that approximately 60 percent of site-generated trips would access the site via the new Capitol Expressway intersection, and about 40 percent of the trips would access the site via the new Quimby Road intersection.

New Intersections

New intersections on Capitol Expressway and Quimby Road would be constructed to provide access to the site. The new intersection on Capitol Expressway would be located approximately midway between Quimby Road and Nieman Boulevard. The new intersection on Quimby Road would be located about midway between Rigoletto Drive and Eastridge Boulevard, or approximately 700 feet from each intersection.

Capitol Expressway Intersection Design

The proposed Capitol Expressway intersection design includes a deceleration lane for southbound vehicles turning right into the site, as well as an acceleration lane for vehicles exiting the site and merging onto southbound Capitol Expressway. Deceleration and acceleration lanes would be warranted based on the projected future traffic volumes with buildout of the site and vehicle speeds on Capitol Expressway. In order to determine other necessary design elements (e.g., signalization, lane configuration, etc.) for this future intersection, vehicle queuing was evaluated and signal warrants were checked based on the projected traffic volumes under approved conditions.

Quimby Road Intersection Design

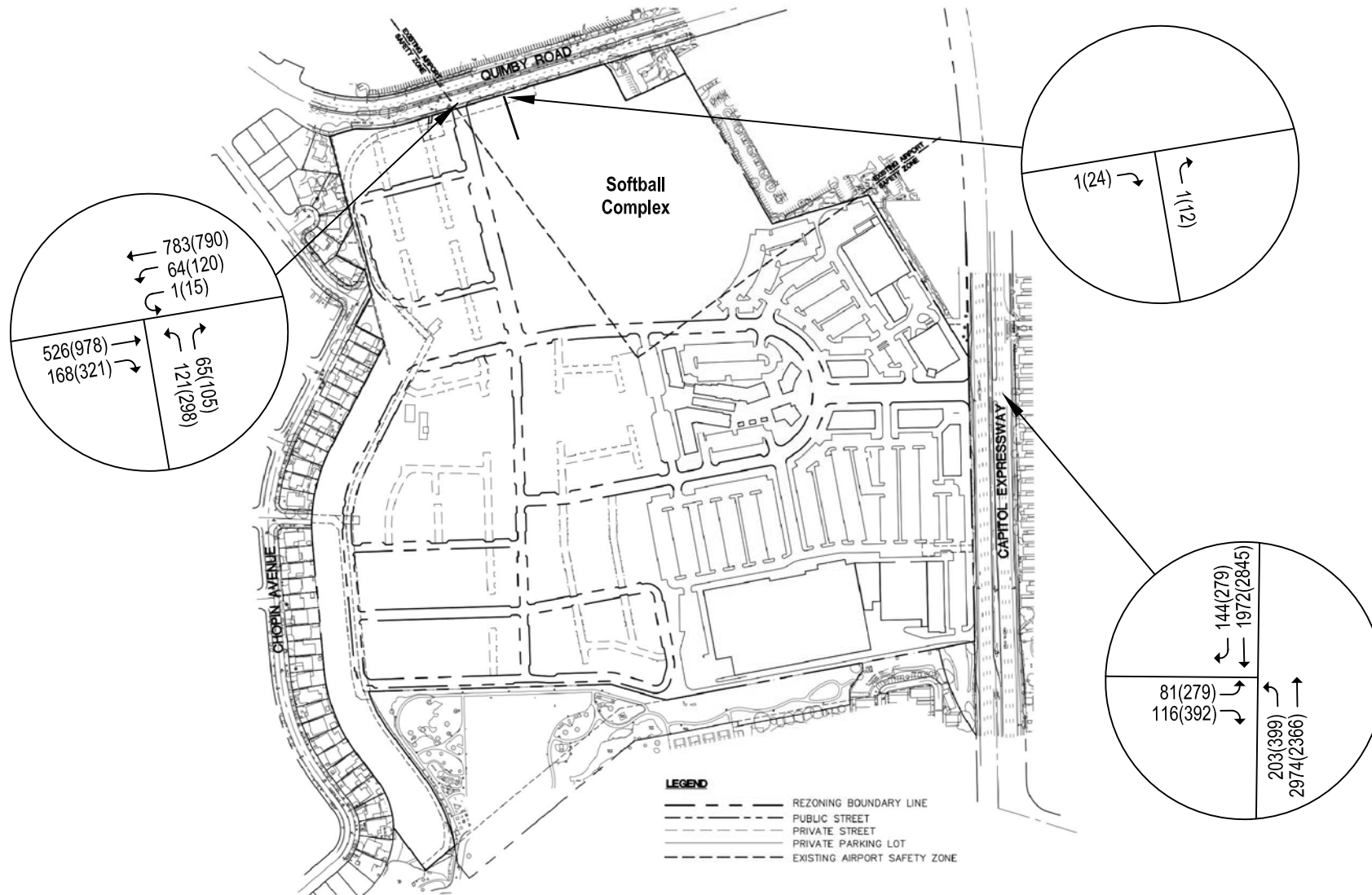
City of San Jose staff have indicated that left turns into the site would be allowed. Providing a westbound left-turn (inbound) movement from Quimby Road would require constructing a channelized left-turn pocket within the existing raised center median. This would involve landscape removal and median reconstruction. City staff have indicated that left turns out of the site onto westbound Quimby Road also would be permitted, but that this would necessitate a new traffic signal. Accordingly, signal warrant checks were prepared for this intersection. In order to determine the design for the proposed Quimby Road intersection (e.g., lane configuration), vehicle queuing was evaluated based on the projected traffic volumes under approved conditions.

Traffic Volumes under Approved Conditions

Traffic volumes at the two proposed new intersections were estimated by adding to background traffic volumes the additional traffic generated by buildout of the entire site. The estimated traffic volumes under approved conditions are shown on Figure 1. Note that the base map used in the report figures is conceptual only and may not represent the most current site plan for the entire site.

Signal Warrants

Peak hour signal warrant checks (*MUTCD 2010 Edition*, Part 4, Warrant 3) were performed for the two future intersections to verify that signalization would be justified on the basis of peak hour traffic volumes under approved conditions. The analysis revealed that the peak hour volume warrant would be satisfied at both locations with buildout of the site. The signal warrant worksheets are included at the end of this memorandum.



Evergreen Circle San Jose, California

Conceptual Grading Plan

HUNTER PROPERTIES

Arcadia Development Co.
San Jose, Ca

PROJECT NO: 21117-P-01

04.02.2014

0 150' 300' N

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LEGEND

XX(XX) = AM(PM) Peak-Hour Traffic Volumes

Figure 1
Traffic Volumes Under Approved Buildout Conditions



Left-Turn Pocket Queuing Analysis under Approved Conditions

Left-turn vehicle queues were estimated at the two future intersections using a Poisson probability distribution, which estimates the probability of “n” vehicles for a movement using the following formula:

$$P(x=n) = \frac{\lambda^n e^{-\lambda}}{n!}$$

Where:

P (x=n) = probability of “n” vehicles in queue per lane

n = number of vehicles in the queue per lane

λ = Average # of vehicles in the queue per lane (vehicles per hour per lane/signal cycles per hour)

The basis of the analysis is as follows: (1) the Poisson probability distribution is used to estimate the 95th percentile maximum number of queued vehicles for a particular movement; (2) the maximum number of vehicles in the queue is translated into a queue length, assuming 25 feet per vehicle; and (3) the estimated queue length is compared to the existing or planned available storage capacity for the movement.

Capitol Expressway Intersection Turn Pocket Storage

Based on the traffic volume and maximum vehicle queues at the proposed new intersection on Capitol Expressway under approved conditions, the design of the intersection would need to include dual northbound (inbound) and eastbound (outbound) left-turn pockets. Based on the results of the queuing analysis, a minimum 400-foot northbound dual left-turn pocket and a minimum 300-foot eastbound dual left-turn pocket are recommended. Based on the proposed site layout, the distance between Capitol Expressway and the T-intersection on-site would total approximately 400 feet. Thus, there would be adequate space on-site to construct a 300-foot eastbound dual left-turn pocket.

Quimby Road Intersection Turn Pocket Storage

Based on the traffic volume and maximum vehicle queues at the proposed new intersection on Quimby Road under approved conditions, the design of the intersection would need to include either a single northbound (outbound) left-turn lane and a shared left/right-turn lane, or a dual northbound left-turn pocket. A single westbound (inbound) left-turn pocket would provide adequate vehicle storage for inbound vehicles. The queuing analysis assumed a single left-turn and shared left/right-turn configuration. Based on the queuing analysis results, 350 feet of northbound (outbound) vehicle storage would be required and a minimum 175-foot single westbound left-turn pocket is recommended.

The maximum vehicle queue estimates under approved conditions are shown in Table 2.

Table 2
Vehicle Queuing Estimates – Approved Conditions

Movement: Peak Hour Period:	New Capitol Expressway Intersection				New Quimby Road Intersection			
	NB Dual Left Turn		EB Dual Left Turn		NB LT+Shared LR		WB Single Left Turn	
	AM	PM	AM	PM	AM	PM	AM	PM
Buildout Conditions								
Cycle/Delay ^{1,2} (sec)	150	190	150	190	75	90	75	90
Volume (vphpl)	102	200	41	140	154	351	65	135
Avg. Queue (veh./ln.)	4.3	10.6	1.7	7.4	3.2	8.8	1.4	3.4
Avg. Queue ³ (ft./ln)	106	264	43	185	80	219	34	84
95th % . Queue (veh./ln.)	8	16	4	12	6	14	3	7
95th % . Queue (ft./ln)	200	400	100	300	150	350	75	175

Notes:

¹ Vehicle queue calculations based on cycle length.

² It was assumed that both intersections would be signalized. Cycle lengths were estimated based on the cycle lengths of adjacent intersections.

³ Assumes 25 feet per vehicle queued.



New Project Trip Generation Estimates

The proposed project was compared to the approved traffic conditions for the site. The project would consist of 344,000 s.f. of retail (200,000 s.f. Arcadia retail + 144,000 s.f. additional retail), 5,000 s.f. of office, 250 high-density residential units, and four softball fields. Based on the City of San Jose trip generation rates, the project would generate 17,444 new daily vehicle trips, with 783 new trips occurring during the AM peak hour and 1,749 new trips occurring during the PM peak hour. Using the inbound/outbound splits recommended by the City of San Jose, the project would produce 460 new inbound and 323 new outbound trips during the AM peak hour, and 904 new inbound and 845 new outbound trips during the PM peak hour. The project trip generation estimates are presented below in Table 3.

Table 3
Trip Generation Estimates – New Project Conditions

Land Use	Size	Daily Rate /a/	Daily Trips	AM Peak Hour			PM Peak Hour				
				Rate /a/	In	Out	Total	Rate /a/	In	Out	Total
Proposed Uses											
Arcadia Retail /b/	200 ksf	70.0	14,000	2.80	336	224	560	7.00	700	700	1,400
Additional Regional Retail /b/	144 ksf	50.0	7,200	2.00	202	86	288	4.50	324	324	648
Office /c/	5 ksf	11.0	55	1.54	7	1	8	1.54	1	7	8
High Density Residential /d/	250 du	7.5	1,875	0.75	66	122	188	0.75	122	66	188
Softball Fields /e/	4 fields	71.3	285	1.12	3	2	5	17.70	47	24	71
Gross Trips:			23,415		614	435	1,049		1,194	1,121	2,315
Trip Reductions											
Mixed-Use Reduction /f/			(563)		(20)	(37)	(57)		(37)	(20)	(57)
Transit Reduction /g/			(38)		(2)	(2)	(4)		(2)	(2)	(4)
Pass-By Reduction /h/			(5,370)		(132)	(73)	(205)		(251)	(254)	(505)
Net Trips:			17,444		460	323	783		904	845	1,749
Notes:											
/a/ Rate per 1,000 SF for retail and office; per DU for residential; per field for softball fields.											
/b/ "Community Shopping" and "Regional Shopping" CSJ rates used. (<i>San Jose Traffic Impact Analysis Handbook</i> , 2009)											
/c/ "General Office Building" CSJ rates used. (<i>San Jose Traffic Impact Analysis Handbook</i> , 2009)											
/d/ "Single Family Attached" CSJ rates used. (<i>San Jose Traffic Impact Analysis Handbook</i> , 2009)											
/e/ Trip rates for softball fields not available so "Soccer Complex" rates used. (<i>ITE Trip Generation</i> , 9th Edition, 2012)											
/f/ A 15% residential/retail mixed-use trip reduction was applied to the project per the Santa Clara VTA TIA Guidelines, March 2009. The 15% trip reduction was first applied to the smaller trip generator (residential). The same number of trips were then subtracted from the larger trip generator (retail) to account for both trip ends.											
/g/ A 2% transit reduction was applied to the residential component of the project since the residential development would be located within 2,000 feet of a Major Bus Stop. (Santa Clara VTA TIA Guidelines, March 2009)											
/h/ A pass-by trip reduction of 25% (standard for the City of San Jose) was applied to the retail component of the project. The reduction was applied to the net retail project trips after applying the transit and mixed-use reductions. Note that while pass-by trips represent a trip reduction on the surrounding roadway network, these vehicle trips already on the roadway network are still considered new trips at the site driveways.											

Traffic Volumes Under New Project Conditions

The assumptions regarding site access and trip distribution described for approved conditions also were applied to the new project conditions analysis. Compared to the approved conditions analysis, the new project would result in 213 more daily vehicle trips to and from the site, with only 25 more trips generated during both the AM and PM peak hours of traffic. Since the new proposed project size is comparable to the



level of development already approved for the 81-acre site, it can be concluded that the proposed Evergreen Circle mixed-use project is consistent with the EEHD Policy. Figure 2 shows the estimated project traffic volumes.

Signal Warrants

Peak hour signal warrant checks (*MUTCD 2010 Edition*, Part 4, Warrant 3) were performed for the two future intersections to verify that signalization would be justified on the basis of peak hour traffic volumes under project conditions. The analysis revealed that the peak hour volume warrant would be satisfied at both locations under project conditions. The signal warrant worksheets are included at the end of this memorandum.

Left-Turn Pocket Queuing Analysis Under New Project Conditions

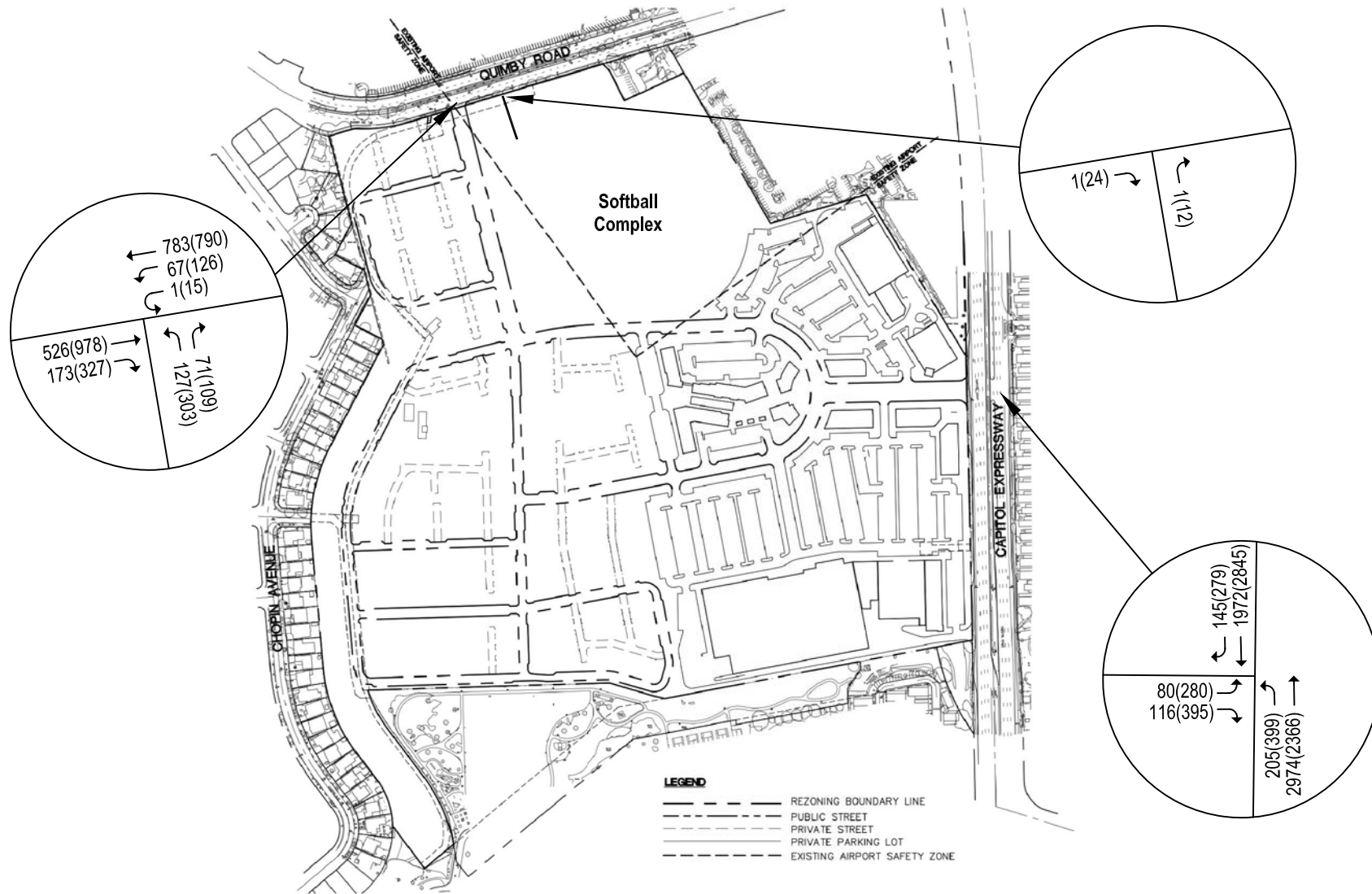
Based on the traffic volumes and maximum vehicle queues at the proposed new intersections on Capitol Expressway and Quimby Road under project conditions, the same configurations required under approved conditions would be needed. (see Table 4).

Table 4
Vehicle Queuing Estimates – New Project Conditions

Movement: Peak Hour Period:	New Capitol Expressway Intersection				New Quimby Road Intersection			
	NB Dual Left Turn		EB Dual Left Turn		NB LT+Shared LR		WB Single Left Turn	
	AM	PM	AM	PM	AM	PM	AM	PM
Buildout Conditions								
Cycle/Delay ^{1,2} (sec)	150	190	150	190	75	90	75	90
Volume (vphpl)	103	200	40	140	163	358	68	141
Avg. Queue (veh/ln.)	4.3	10.6	1.7	7.4	3.4	9.0	1.4	3.5
Avg. Queue ³ (ft./ln.)	107	264	42	185	85	224	35	88
95th % Queue (veh/ln.)	8	16	4	12	7	14	4	7
95th % Queue (ft./ln.)	200	400	100	300	175	350	100	175
Notes:								
¹ Vehicle queue calculations based on cycle length.								
² It was assumed that both intersections would be signalized. Cycle lengths were estimated based on the cycle lengths of adjacent intersections.								
³ Assumes 25 feet per vehicle queued.								

Site Access and Circulation Under New Project Conditions

Access to the 81-acre site and on-site circulation were evaluated according to the most recent site plan provided for the Evergreen Circle project (see Figure 3). According to the site plan, the proposed retail uses would be located along Capitol Expressway, while the residential component of the project would be situated furthest from Capitol Expressway along the western boundary of the site. With buildout of the site, an extensive internal roadway network would be constructed to connect all of the proposed land uses. The internal roadway network would be accessible via Capitol Expressway and Quimby Road and would consist of a mix of public and private streets. The public streets include Evergreen Place, the North and South Loop Roads and A Street. The street that fronts Meadowfair Park and the north-south oriented street that runs along the western boundary of the site also would be public streets. All of the public streets would be built to City of San Jose public street standards. The east-west oriented streets within the residential development would be private streets with a minimum width of 34 feet measured curb-to-curb: 7 feet of parking on both sides and a 20-foot two-way travel lane. The Fire Department typically requires a minimum of 20 feet for emergency vehicle access (EVA).



Evergreen Circle San Jose, California

Conceptual Grading Plan

HUNTER PROPERTIES

Arcadia Development Co.
San Jose, Ca

PROJECT NO: 21117-P-01

04.02.2014

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XX(XX) = AM(PM) Peak-Hour Traffic Volumes

Figure 2

Traffic Volumes Under New Project Conditions

Recommendation:
Close Median Break

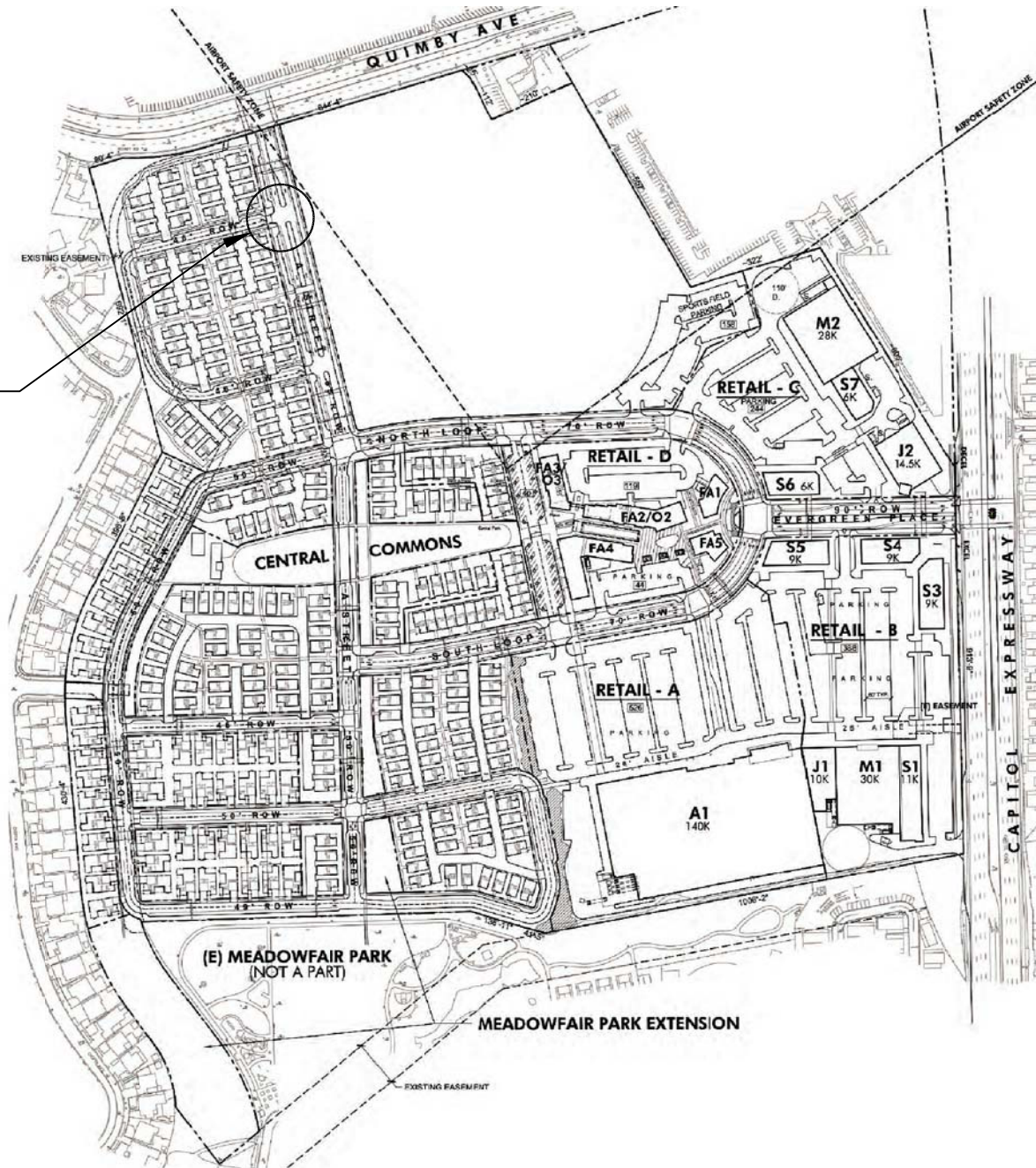


Figure 3
Conceptual Site Plan



Capitol Expressway Entrance

The main entrance to the project site would be provided via a new signal on Capitol Expressway. An unsignalized T-intersection is proposed on site approximately 400 feet west of the new signal. The project is proposing a two-way stop-controlled intersection, but is also considering an alternative design that includes a roundabout. If built as an unsignalized T-intersection, the inbound (westbound) movement would need to be a free movement (i.e., no stop-control). In order for this to occur, the proposed crosswalk on the westbound leg of this intersection would need to be removed. The northbound and southbound approaches would be stop-controlled and, ideally, both would have crosswalks. One issue with this two-way stop-controlled design is the potential conflict between the free inbound (westbound left-turn) movement and pedestrian crossings on the northbound leg of the intersection. This pedestrian safety issue would need to be addressed in the ultimate design of the intersection.

Two-Way Stop-Controlled Intersection Traffic Simulation

Synchro software was used to develop a SimTraffic simulation to demonstrate that the two-way stop-controlled intersection configuration would operate adequately. The simulation shows that inbound vehicles would flow freely into the site, and there would be adequate vehicle storage between the new signalized intersection and stop-controlled intersection for the outbound vehicle queues that would develop under project conditions. However, City of San Jose staff reviewed the traffic simulation and have expressed their concern regarding the potential for pedestrian-vehicle conflicts as described above.

Roundabout Capacity Evaluation

A roundabout would operate more efficiently than a stop-controlled intersection and is currently being considered as an alternative intersection configuration. The operation of the roundabout under site buildout traffic conditions was evaluated using the Roundabout Analysis Tool (Version 1.1), which is a spreadsheet developed by the Georgia Department of Transportation Office of Traffic Operations. The analysis tool is based on the National Cooperative Highway Research Program (NCHRP) Report 572 Model, published by the Transportation Research Board (TRB), and the Federal Highway Administration (FHWA) Roundabout Design Guide (2000) standards. The NCHRP Model is based on an analytical method derived from gap acceptance behavior of drivers at roundabouts in the United States.

Based on the roundabout capacity evaluation, it was determined that the intersection would operate adequately as a single-lane roundabout, with all three legs operating at LOS C or better under project conditions. Based on project traffic volumes, little queuing would occur at the roundabout approaches. In addition, a roundabout design would be more pedestrian friendly than a two-way stop-controlled intersection design, since it would slow down the westbound (inbound) left-turn movement, which is the conflicting movement.

The alternative roundabout design that is being considered is in the preliminary design stage. Once the design has been finalized, a drawing will be submitted to Hexagon and City staff for their review. This traffic study does not include the current conceptual design.

Quimby Road Entrance

Full access to the project site would be provided via a new traffic signal on Quimby Road. In order to provide the required 350 feet of northbound (outbound) vehicle storage on-site, the proposed median break at the existing cross street on-site would need to be eliminated (see recommendation on Figure 3).

Pedestrian and Bicycle Access and On-Site Circulation

Sidewalks and crosswalks would be constructed throughout the entire 81-acre site with connections between the residential development, softball complex and retail uses. The plan also shows bike lanes along Evergreen Place, the North and South Loop Roads, and A Street. Bike racks should be provided at the softball complex and entrances to all of the commercial buildings on the site.

Installing a new signal on Quimby Road would include crosswalks with pedestrian signal heads and push buttons, and would provide a safe pedestrian connection between the project site and Eastridge Mall,



including the Eastridge Transit Center. Quimby Road has Class II (striped) buffered bike lanes, providing a safe bicycle route to and from the site.

Softball Complex Access and Circulation

Two parking lots would serve the softball complex. Quimby Road would provide direct access (right-turn only) to one 96-space parking lot, and a second 137-space softball complex parking lot would be accessed via the future internal roadway network that would be developed with buildout of the entire site. The site plan for the softball complex shows good circulation through the parking lot with standard 26-foot wide drive aisles and no dead-ends. No vehicular connection would exist between the two parking lots.

The site plan shows a north-south pedestrian walkway and an east-west pedestrian walkway, creating four softball fields of equal size. The walkways would meet at the center of the site, where the restroom and concession building would be located, and would provide access to the player dugouts and spectator bleachers.

Conclusions and Recommendations

The signal warrant analysis revealed that the peak hour volume warrant would be satisfied at the two proposed intersections (Capitol Expressway and Quimby Road entrances) with buildout of the entire 81-acre site.

Based on the results of the vehicle queuing analysis, a new signalized intersection on Capitol Expressway would need a 400-foot northbound dual left-turn pocket and a 300-foot eastbound dual left-turn pocket to accommodate the estimated maximum vehicle queues that would develop under both approved traffic conditions and project traffic conditions.

Based on the results of the vehicle queuing analysis, a new signalized intersection on Quimby Road would need 350 feet of northbound (outbound) vehicle storage and a 175-foot westbound single left-turn pocket to accommodate the estimated maximum vehicle queues that would develop under both approved traffic conditions and project traffic conditions. In order to provide 350 feet of northbound (outbound) vehicle storage, the proposed median break at the existing cross street on-site would need to be eliminated (see note on Figure 3).

It is important to note that the final project description may include more office space in place of some of the retail space. Since converting retail space into office space would reduce the number of project-generated peak hour vehicle trips, this traffic operations study presents a worst-case traffic scenario.

Synchro software was used to develop a SimTraffic simulation to demonstrate that the proposed unsignalized T-intersection, located on-site near the main Capitol Expressway entrance, would operate adequately as a two-way stop-controlled intersection. The simulation shows that inbound vehicles would flow freely into the site, and there would be adequate vehicle storage between the new signalized intersection and stop-controlled intersection for the outbound vehicle queues that would develop under project conditions. However, City of San Jose staff reviewed the traffic simulation and have expressed their concern regarding the potential for pedestrian-vehicle conflicts. For this reason, a roundabout design is being considered as an alternative.

Based on the roundabout capacity evaluation, it was determined that the unsignalized intersection would operate adequately as a single-lane roundabout, with all three legs operating at LOS C or better under project conditions. Based on project traffic volumes, little queuing would occur at the roundabout approaches. In addition, a roundabout design would be more pedestrian friendly than a two-way stop-controlled intersection design, since it would slow down the westbound (inbound) left-turn movement, which is the conflicting movement. For this reason, an alternative roundabout design is being considered.

Bike racks should be provided at the softball complex and at the entrances to the commercial buildings.

Arcadia Evergreen Circle

TRAFFIC SIGNAL WARRANTS WORKSHEET

Analyst: BJ date: 9/16/14

Major Street: Capitol Expwy
 Minor Street: / Evergreen Pl

Critical Approach Speed* (mph) 45
 Critical Approach Speed* (mph) 25
 *Posted Speed.

Critical speed of major street traffic > 50 mph (64 km/h)..... }
 or } **Rural (R)**
 In built up area of isolated community of < 10,000 population..... }
 Urban (U)

AM PEAK PERIOD

Warrant 3 - Peak Hour

PART A

(All parts 1, 2, and 3 below must be satisfied)

AM PEAK PERIOD

	Approved	Project						
Minor Street Approach Direction w/ Highest Delay	EB	EB						
Highest Minor Street Average Delay (sec/veh)	7233.8	5420.6						
Corresponding Minor Street Approach Volume (veh/hr)	197	196						
Minor Street Total Delay (veh-hrs)	395.8	295.1						
1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds 4 vehicle-hours for a 1-lane approach and 5 vehicle-hours for a 2-lane approach; <u>AND</u>	Yes	Yes						
2. The volume on the same minor street approach equals or exceeds 100 vph for 1 moving lane of traffic or 150 vph for 2 moving lanes; <u>AND</u>	Yes	Yes						
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with 4 or more approaches or 650 vph for intersections with 3 approaches.	Yes	Yes						
Signal Warranted based on Part A?	Yes	Yes						

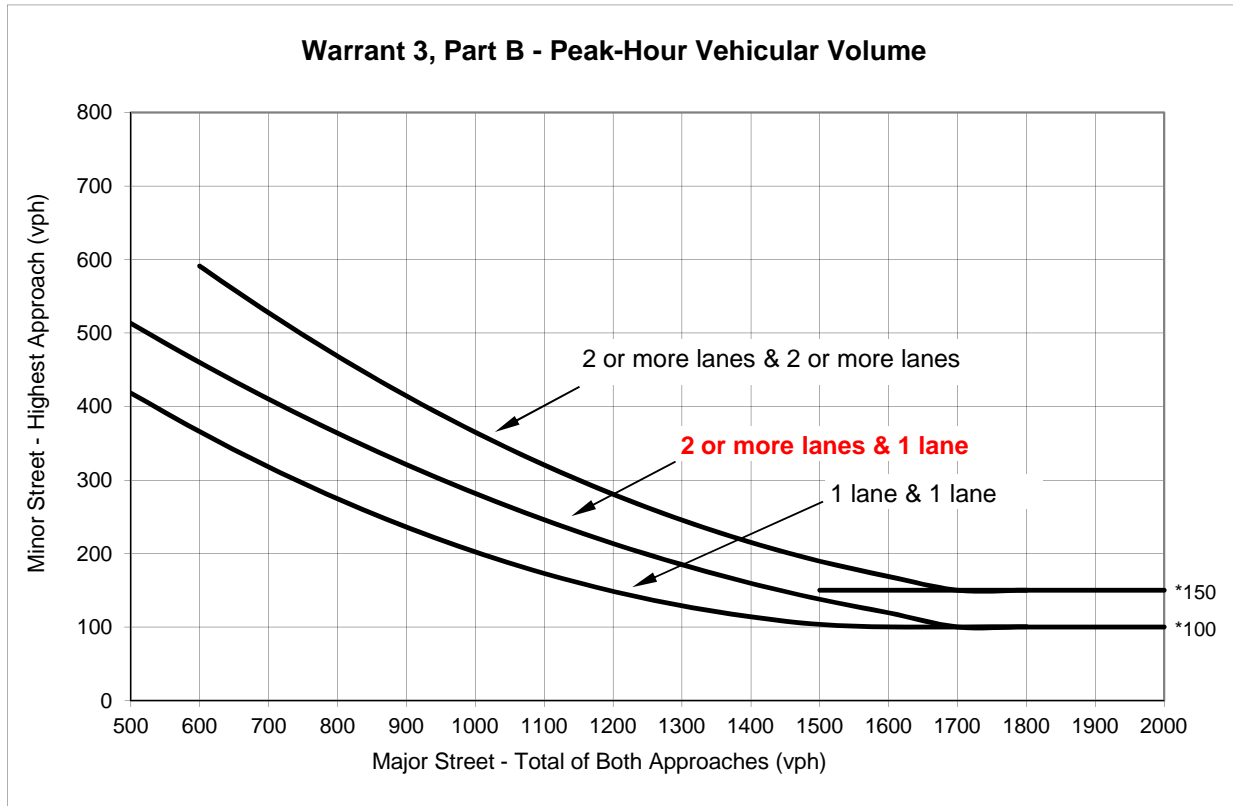
PART B

AM PEAK PERIOD

		Approach Lanes		Approved	Project					
		One	2 or More							
Major Street - Both Approaches	Capitol Expwy		X	5149	5151					
Minor Street - Highest Approach	/ Evergreen Pl	X		197	196					
Signal Warranted based on Part B?				Yes	Yes					

The Warrant is satisfied if the plotted point for vehicles per hour on the major street (both approaches) and the corresponding per hour higher vehicle volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) fall above the applicable curves in California MUTCD Figure 4C-3 or 4C-4.

Source: California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2003 Edition, as amended for use in California).



Source: Figure 4C-3 California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California).

* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Warrant 3, Part B - Peak-Hour Vehicular Volume

		Approach Lanes		AM PEAK PERIOD						
		One	Two or More	Approved	Project					
Major Street - Both Approaches	Capitol Expwy		X	5149	5151					
Minor Street - Highest Approach	/ Evergreen Pl	X		197	196					
Signal Warranted Based on Part B - Peak-Hour Volumes?				Yes	Yes					

*Warrant is satisfied if plotted points fall above the appropriate curve in graph above.

Arcadia Evergreen Circle

TRAFFIC SIGNAL WARRANTS WORKSHEET

Analyst: BJ date: 9/16/14

Major Street: Capitol Expwy
 Minor Street: / Evergreen Pl

Critical Approach Speed* (mph) 45
 Critical Approach Speed* (mph) 25
 *Posted Speed.

Critical speed of major street traffic > 50 mph (64 km/h)..... }
 In built up area of isolated community of < 10,000 population..... } **Rural (R)**
 Urban (U)

PM PEAK HOUR

Warrant 3 - Peak Hour

PART A

(All parts 1, 2, and 3 below must be satisfied)

		PM PEAK HOUR						
		Approved	Project					
Minor Street Approach Direction w/ Highest Delay		EB	EB					
Highest Minor Street Average Delay (sec/veh)		9999.0	9999.0	(Infinite Delays)				
Corresponding Minor Street Approach Volume (veh/hr)		671	675					
Minor Street Total Delay (veh-hrs)		1863.7	1874.8					
1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds 4 vehicle-hours for a 1-lane approach and 5 vehicle-hours for a 2-lane approach; <u>AND</u>		Yes	Yes					
2. The volume on the same minor street approach equals or exceeds 100 vph for 1 moving lane of traffic or 150 vph for 2 moving lanes; <u>AND</u>		Yes	Yes					
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with 4 or more approaches or 650 vph for intersections with 3 approaches.		Yes	Yes					
Signal Warranted based on Part A?		Yes	Yes					

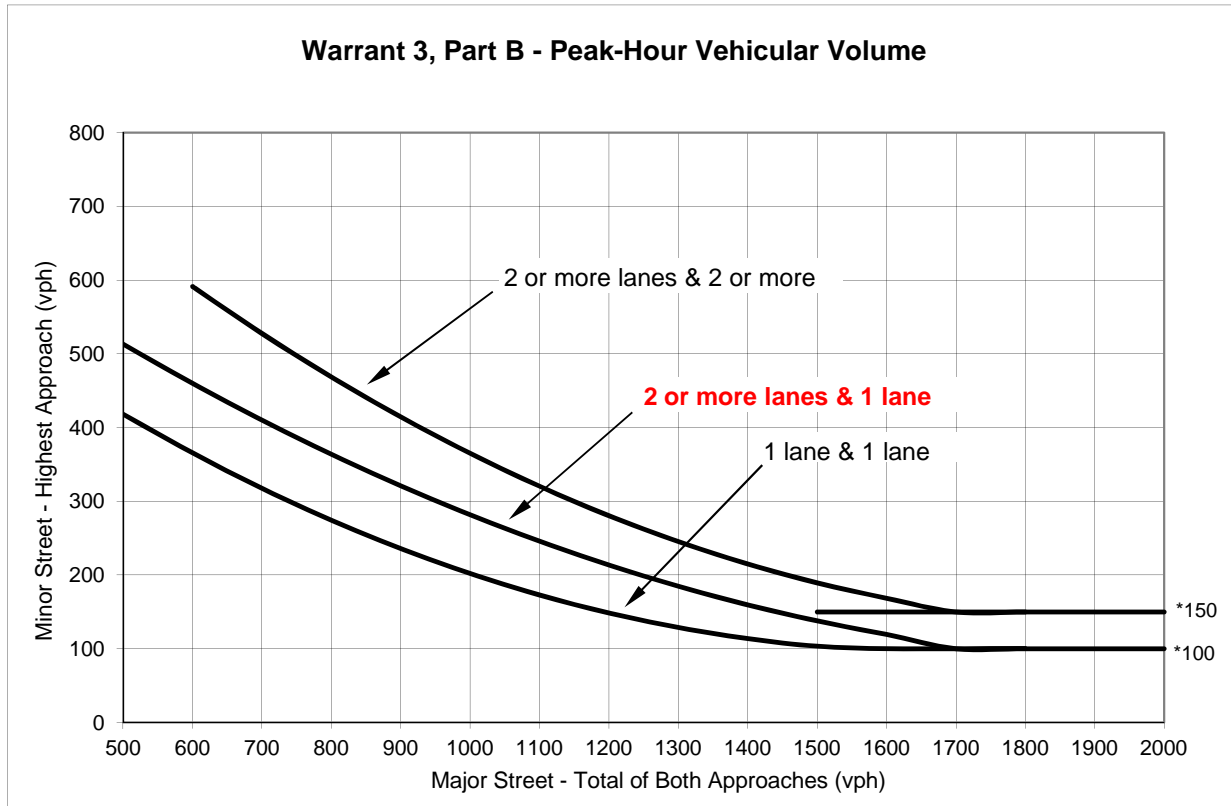
PART B

		PM PEAK HOUR						
		Approach Lanes		Approved	Project			
		One	2 or More					
Major Street - Both Approaches	Capitol Expwy		X	5610	5610			
Minor Street - Highest Approach	/ Evergreen Pl	X		671	675			
Signal Warranted based on Part B?				Yes	Yes			

The Warrant is satisfied if the plotted point for vehicles per hour on the major street (both approaches) and the corresponding per hour higher vehicle volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) fall above the applicable curves in California MUTCD Figure 4C-3 or 4C-4.

Source: California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2003 Edition, as amended for use in California).
 Notes:

Volume reduction applied to one or more right-turn movements due to high right-turn volume and potential for some right-turn on red activity. Right-turn reduction carried out based on cross street through volume and number of cross street through lanes us SB RT/



Source: Figure 4C-3 California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California).

* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Warrant 3, Part B - Peak-Hour Vehicular Volume

		Approach Lanes		PM PEAK HOUR						
		One	2 or More	Approved	Project					
Major Street - Both Approaches	Capitol Expwy		X	5610	5610					
Minor Street - Highest Approach	/ Evergreen Pl	X		671	675					
Signal Warranted Based on Part B - Peak-Hour Volumes?				Yes	Yes					

*Warrant is satisfied if plotted points fall above the appropriate curve in graph above.

Arcadia Evergreen Circle

TRAFFIC SIGNAL WARRANTS WORKSHEET

Analyst: BJ date: 9/16/14

Major Street: Quimby Rd
 Minor Street: / A Street

Critical Approach Speed* (mph) 35
 Critical Approach Speed* (mph) 25
 *Posted Speed.

Critical speed of major street traffic > 50 mph (64 km/h)..... }
 or } **Rural (R)**
 In built up area of isolated community of < 10,000 population..... }
 Urban (U)

AM PEAK PERIOD

Warrant 3 - Peak Hour

PART A

(All parts 1, 2, and 3 below must be satisfied)

AM PEAK PERIOD

	Approved	Project						
Minor Street Approach Direction w/ Highest Delay	NB	NB						
Highest Minor Street Average Delay (sec/veh)	30.9	29.6						
Corresponding Minor Street Approach Volume (veh/hr)	186	198						
Minor Street Total Delay (veh-hrs)	1.6	1.6						

1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds 4 vehicle-hours for a 1-lane approach and 5 vehicle-hours for a 2-lane approach; <u>AND</u>	No	No						
2. The volume on the same minor street approach equals or exceeds 100 vph for 1 moving lane of traffic or 150 vph for 2 moving lanes; <u>AND</u>	Yes	Yes						
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with 4 or more approaches or 650 vph for intersections with 3 approaches.	Yes	Yes						
Signal Warranted based on Part A?	No	No						

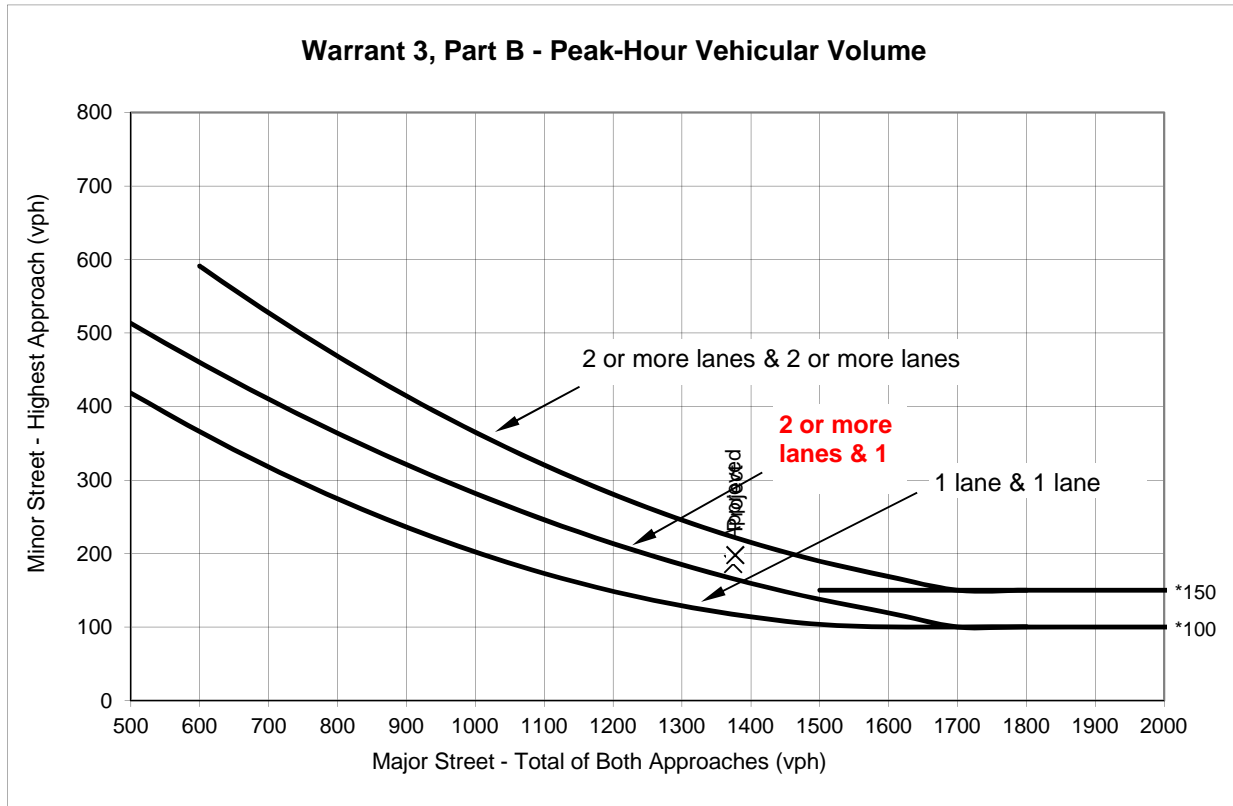
PART B

AM PEAK PERIOD

	Approach Lanes	2 or More		Approved	Project					
		One	More							
Major Street - Both Approaches	Quimby Rd		X	1374	1377					
Minor Street - Highest Approach	/ A Street	X		186	198					
Signal Warranted based on Part B?				Yes	Yes					

The Warrant is satisfied if the plotted point for vehicles per hour on the major street (both approaches) and the corresponding per hour higher vehicle volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) fall above the applicable curves in California MUTCD Figure 4C-3 or 4C-4.

Source: California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2003 Edition, as amended for use in California).



Source: Figure 4C-3 California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California).

* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Warrant 3, Part B - Peak-Hour Vehicular Volume

		Approach Lanes		AM PEAK PERIOD							
		One	Two or More	Approved	Project						
Major Street - Both Approaches	Quimby Rd		X	1374	1377						
Minor Street - Highest Approach	/ A Street	X		186	198						
Signal Warranted Based on Part B - Peak-Hour Volumes?				Yes	Yes						

*Warrant is satisfied if plotted points fall above the appropriate curve in graph above.

Arcadia Evergreen Circle

TRAFFIC SIGNAL WARRANTS WORKSHEET

Analyst: BJ date: 9/16/14

Major Street: Quimby Rd
 Minor Street: / A Street

Critical Approach Speed* (mph) 35
 Critical Approach Speed* (mph) 25
 *Posted Speed.

Critical speed of major street traffic > 50 mph (64 km/h)..... }
 In built up area of isolated community of < 10,000 population..... } **Rural (R)**
 Urban (U)

PM PEAK HOUR

Warrant 3 - Peak Hour

PART A

(All parts 1, 2, and 3 below must be satisfied)

	PM PEAK HOUR						
	Approved	Project					
Minor Street Approach Direction w/ Highest Delay	NB	NB					
Highest Minor Street Average Delay (sec/veh)	1110.6	959.9					
Corresponding Minor Street Approach Volume (veh/hr)	403	412					
Minor Street Total Delay (veh-hrs)	124.3	109.9					
1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds 4 vehicle-hours for a 1-lane approach and 5 vehicle-hours for a 2-lane approach; <u>AND</u>	Yes	Yes					
2. The volume on the same minor street approach equals or exceeds 100 vph for 1 moving lane of traffic or 150 vph for 2 moving lanes; <u>AND</u>	Yes	Yes					
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with 4 or more approaches or 650 vph for intersections with 3 approaches.	Yes	Yes					
Signal Warranted based on Part A?	Yes	Yes					

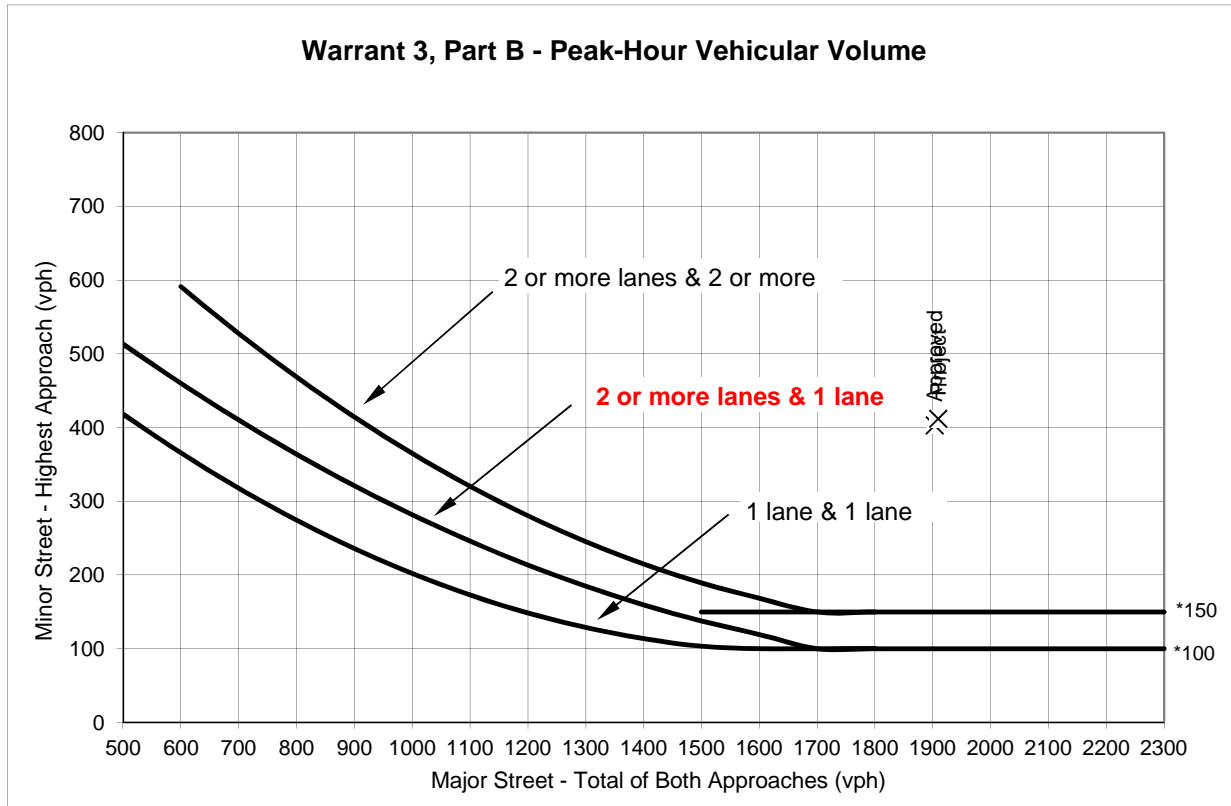
PART B

	Approach Lanes	PM PEAK HOUR							
		Approved	Project						
									One
Major Street - Both Approaches	Quimby Rd		X	1903	1909				
Minor Street - Highest Approach	/ A Street	X		403	412				
Signal Warranted based on Part B?		Yes	Yes						

The Warrant is satisfied if the plotted point for vehicles per hour on the major street (both approaches) and the corresponding per hour higher vehicle volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) fall above the applicable curves in California MUTCD Figure 4C-3 or 4C-4.

Source: California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2003 Edition, as amended for use in California).
 Notes:

Volume reduction applied to one or more right-turn movements due to high right-turn volume and potential for some right-turn on red activity. Right-turn reduction carried out based on cross street through volume and number of cross street through lanes us EB RT



Source: Figure 4C-3 California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California).

* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Warrant 3, Part B - Peak-Hour Vehicular Volume

		Approach Lanes		PM PEAK HOUR					
		One	2 or More	Approved	Project				
Major Street - Both Approaches	Quimby Rd		X	1903	1909				
Minor Street - Highest Approach	/ A Street	X		403	412				
Signal Warranted Based on Part B - Peak-Hour Volumes?				Yes	Yes				

*Warrant is satisfied if plotted points fall above the appropriate curve in graph above.