DEPARTMENT OF TRANSPORTATION

DATE: February 5, 2020

TO: Steve Mermell, City Manager

FROM: Laura Cornejo, Director FOR

SUBJECT: **RESPONSES TO MADISON HEIGHTS NEIGHBORHOOD ASSOCIATION CORRESPONDENCE- 253 S. Los Robles Avenue**

Below are staff responses to the Madison Heights January 6, 2020, correspondence (Attachment C). Other commenters have submitted substantially the same comments.

The transportation analysis for the 253 S. Los Robles Avenue was prepared by DOT staff per City's Transportation Impact Analysis Guidelines. The analysis included CEQA and outside of CEQA analysis and associated reports. It is important to note that as the City's Department of Transportation, the analyses carried out are limited to analyzing the proposed project's transportation-related impacts.

Response to #1

Along with the adoption of VMT by the City Council in 2015, the City transportation impact analysis guidelines include an outside CEQA LOS and street segment analyses as a hybrid approach to assess new development projects. As such, LOS has not been disregarded as an evaluation metric and is analyzed by the City.

Response to #2

Per State law and the most recent changes to CEQA Guidelines, automobile delay as traditionally measured by Level of Service (LOS) is no longer considered a significant environmental impact. Accordingly, public agencies may no longer impose mitigation measures based on LOS. Under the outside CEQA analysis, the City guidelines uses LOS and street segment analysis with established caps as discretionary analytical tools to assess the transportation network conditions near the proposed project to protect residential neighborhoods. Staff uses the transportation system findings to impose feasible and effective project conditions when caps are exceeded and such conditions are warranted.

Response to #3 & #4

The City does use the Highway Capacity Manual (HCM) Method for LOS calculations. The findings in the City of Pasadena Traffic Impact Analysis for 253 S. Los Robles Avenue are based on HCM calculations of LOS. The commenter incorrectly states that the City used the Intersection Capacity Utilization (ICU) methodology for the traffic analysis of 253 S. Los Robles Avenue. While the ICU method results are presented in the appendix as part of the standard Synchro output screen, only the LOS calculated using the HCM methodology is used in the traffic impact analysis.
As noted in response number 2, the LOS is used as a discretionary analytical tool to assess the traffic conditions near the new development project and does not warrant decimal point accuracy as was required when LOS was used as a CEQA impact. Having said that, staff is of the opinion that HCM LOS methodology has not evolved significantly as evidenced by the updated LOS results provided in the Attachment A. A comparison of HCM 2000 to HCM 2010 LOS results used for the project, not ICU per commenter, shows no changes to the previous findings. Please see Attachment A.

Response to #5 – #8

DOT continuously monitors transportation system collisions to enhance safety as a stated policy in the Mobility Element of the 2015 General Plan. In developing the CIP budget, the first priority is to focus on safety issues within the City's infrastructure.

Citywide, total collision numbers are on a five-year downward trend. In addition, the total number of injury and fatal collisions are also on a five-year downward trend.

The downward trend in total number of reported collisions is also seen on the roadway segment of Los Robles Avenue between Cordova Street and California Boulevard (including collisions at the intersections of Los Robles Avenue/Cordova Street, Los Robles Avenue/Del Mar Boulevard, and Los Robles Avenue/California Blvd). The total number of reported collisions per year for Los Robles Avenue between Cordova Street and California Boulevard (inclusive of intersection collisions) is presented in the following table:

Year	Total Reported Collisions
2015	14
2016	8
2017	9
2018	8
2019	5

It should also be noted that citywide, there have been zero fatal collisions in the past four years during the most congested periods of travel, 7am – 9am and 4pm – 6pm.

There is an inverse correlation between congestion and severity of collisions types. For example, the commenter notes lowered pedestrian fatalities with lower speeds. Please see response to #9. Congestion type collisions are generally limited to property damage only due to the low speeds involved.

Per DOT's review, the proposed project is not expected to cause additional safety concerns with its lone access point on Los Robles Avenue located 200 feet from both intersections of Los Robles Ave/Del Mar Blvd and Los Robles Ave/Cordova St, or pedestrian line of sight safety concerns. To further improve pedestrian safety the project is conditioned to provide a 12'-wide sidewalk, and at minimum a 20-foot flat area beyond the property line so that motorists have a clear sight of pedestrians when exiting the site driveway. In addition, the proposed location of the project complies with DOT's Driveway Design Guidelines.

Response to #9

Staff concurs with the statement that lower speeds correlates to severity of pedestrian collisions. However, LOS is not a tool for speed management. LOS, instead further prioritizes road design that encourages and facilities faster vehicular travel while disregarding the negative impact that improved LOS has on other modes of transportation, including pedestrians. In addition, the City has a 5-year speed management capital improvement project, which monitors and implements measures for managing speeds on city streets.

Response to #10 – #13

Increasing transit ridership by improving headway (reducing the wait time for the next bus) is identified as a mitigation measure in the adopted 2015 Mobility Element of the General Plan. Purchase of transit buses to improve headway is one of the several projects identified in the Transportation Impact Fee nexus study adopted by the City Council. Other projects include implementation of complete streets infrastructure elements such as pedestrians and bike facilities. Attachment B lists transportation impact fee 5-year expenditure plan included in the Mitigation Fee Act Annual Report as presented to the City's Finance Committee on December 9, 2019. The report includes the most current information as to how the Transportation Impact Fee has been applied.

The December 9, 2019 report shows approximately $1-million spent on ITS and safety enhancements, and over $2-million allocated through FY 2019 for the future projects excluding transit. In FY2020, the current Capital Improvement Program has an additional $3.3 million in Traffic Impact Fee/Trip Reduction Fee allocated for traffic operations and traffic safety projects, excluding transit projects. This value is not reflected in the December 9, 2019 report, because that report evaluated the time period up to FY2019.

Through Fiscal Year 2019, the following Capital Improvement Program projects have received funding through the Transportation Impact Fee/Trip Reduction Fee.

75049	Traffic Signal Improvements at Pasadena Ave and Walnut St
75043	Detection of Bicycles at Intersections Controlled by Traffic Signals
75703	North Marengo Ave Bicycle Boulevard
75711	Traffic Mitigation Improvement/Traffic Operations Improvements
75710	Traffic Signal Synchronization Hill Ave
75712	Traffic Signal Synchronization Orange Grove Blvd
75713	Traffic Signal Synchronization Sierra Madre Blvd
75716	Traffic Signal Synchronization Del Mar Blvd
75910	Intelligent Transportation System (ITS) Project Phase II: • Sierra Madre Boulevard • Hill Avenue • Foothill Boulevard • Fair Oaks Avenue (Adaptive Traffic Control System)
75079	Mobility Corridor Improvements FY 2016-20
75074	Complete Streets - Lida St
75052	Complete Streets - Cordova St
75087	Complete Streets - Union Street Cycle Track Phase I
75707	Transit Maintenance Facility
75911	ITS Master Plan Phase III • Washington Blvd • Marengo Ave • Sierra Madre Blvd • San Gabriel Blvd • Rosemead Blvd
75089	Safety Enhancements at Lincoln/Forest and Lincoln/Mountain
75090	Left Turn Signal Phasing at Fair Oaks and Colorado
75094	Implement Bus Signal Priority System on Pasadena Transit Buses
75095	Adaptive Traffic Control Network Phase II • California Blvd • Del Mar Blvd • Lake Ave • Foothill Blvd

Responses to #14 & #15

Staff used professional judgment to manually assign/distribute project trips for the LOS and street segment analyses rather than the model suggested by the comment.

Response to #16

Staff uses a parcel-based calibrated Transportation Forecasting Model refined and built on SCAG's regional model. City's model is used in-house and is not shared with private consultants without authorization. The TDF model is calibrated to base-year to accurately replicate the actual traffic counts on major roads within certain margin of error established in 2010 California Regional Transportation Plan Guidelines.

Response to #17

Please see responses to #14 & 15 above

Response to #18 & #19

The Prism Engineering "Traffic Engineering Review" report prepared for the Madison Heights Neighborhood Association (dated January 8, 2020) provides anecdotal information from residents about northbound queuing on Los Robles Avenue in the AM Peak period. However, the report does not provide any observations from the engineer that authored the report, nor does it provide any data regarding queue length, delay or traffic counts.

Should northbound queuing along this section of Los Robles Avenue be a concern for motorists exiting the proposed driveway for 253 S. Los Robles Avenue, traffic signal timing can be modified at the intersections of Los Robles Ave/Cordova Street and Los Robles Ave/Del Mar Blvd to help create gaps in northbound traffic.

Response to #19

Staff concurs that although making left turns to travel north on Los Robles Avenue might be challenging for a brief and select short time periods in a day, but limiting the driveway operations for the balance of the day is not advised. Furthermore, restricting the driveway egress to southbound right-turn-only could potentially add more traffic to Los Robles Avenue segment south of Del Mar Boulevard.

MHNA Comment:

MHNA believes there is oversight on the City's behalf for not recognizing the need for a cumulative traffic report to study the increase in vehicle trips generated by several projects within the Los Robles corridor, instead opting to consider each project's newly generated vehicle trips separately. We have found with the additional information discovered in this new traffic engineering review that even the technical methods used in the City's traffic study procedures raise serious concerns in the validity of the study results. MHNA questions the existing volume for Los Robles and Del Mar and the lack of a vehicle cap creating a threshold of what the streets can withstand. MHNA believes the combination of all these future projects will in fact add significant impact to our neighborhood connector street of Los Robles and therefore should trigger a stronger

and more thorough investigation by DOT, such as an independent traffic study prepared according to standard best practices, and using engineering judgment in evaluation of a project's future impacts to the local street system.

Response

The TDF model project-level transportation impact analysis estimates citywide with or without project cumulative VMT and VT metrics, and incremental changes to assess project level impacts. In addition, cumulative impacts of development projects planned and proposed per the adopted Land Use Element have been addressed in the Mobility Element of the 2015 General Plan. The full build-out of the adopted Land Use is forecasted to be below the adopted CEQA thresholds.
Los Robles Avenue is designated as a Principal Arterial with three lanes of traffic. The highest peak-hour volume south of Cordova St is approximately 650 vehicles in the northbound direction (accommodated by two travel lanes) and approximately 600 vehicles in the southbound direction (in one travel lane). These peak hour volumes are far below the roadway capacity of 800 to 1000 cars per hour per lane.

MHNA Comment:

Lastly, 253 South Los Robles cannot be found to be exempt from CEQA because safety issues have not been studied or addressed. The high levels of traffic congestion mixing with pedestrians and bikes combined with road design issues must be evaluated. An EIR would look at all these issues specifically and the traffic study portion in the EIR would go beyond the VMT air quality component.

Response

See Response to #5 to #8 above. The City has already conducted a full analysis of transportation impacts pursuant to CEQA for the subject project consistent with state law. An EIR would not include any additional transportation analysis, and therefore an EIR would not support imposition of any mitigation measures.

Attachments: (3)

Attachment A – Comparison of Level of Service (LOS)
Attachment B – Transportation Impact Fee 5-Year Expenditure Plan
Attachment C – January 6, 2020 MHNA Letter

ATTACHMENT A- COMPARISON OF LEVEL OF SERVICE (LOS) USING HCM 2000 VS HCM 2010- 253 S LOS ROBLES AVENUE PROJECT

Intersection	Peak Hour	Projects HCM 2000 Existing w/Project		Project HCM2010 Existing w/Project		Exceeds Cap
		Delay	LOS	Delay	LOS	Yes/No
Cordova Street at Los Robles Avenue	AM	11.5	B	15.8	B	No
	PM	15.5	B	17.1	B	No
Cordova Street at Marengo Avenue	AM	20.8	C	13.9	B	No
	PM	33.9	C	22.9	C	No
Del Mar Boulevard at Los Robles Avenue	AM	18.6	B	21.7	C	No
	PM	17.6	B	22.9	C	No
Del Mar Boulevard at Marengo Avenue	AM	23.6	C	24.6	C	No
	PM	40.4	D	31.9	C	No
Green Street at Los Robles Avenue	AM	13.6	B	16.7	B	No
	PM	13.8	B	16.7	B	No
Green Street at Marengo Avenue	AM	16.1	B	16.2	B	No
	PM	27.1	C	27.0	C	No
Union Street at Los Robles Avenue	AM	12.4	B	20.0	B	No
	PM	10.7	B	10.7	B	No

Response to MHNA
February 5, 2020
Attachment B

ATTACHMENT B - TRANSPORTATION IMPACT FEE 5-YEAR EXPENDITURE PLAN

Table 3			Construction		Five (5) Year Development Impact Fee Review: FY 2015 to FY 2019						
Project Numbe	Project Name	Project Phase	Estimated Construction Start	Estimated Project	FY 2015 to FY 2019 Impact Fee Expenditures (E)	FY 2015 to FY 2019 Total All Expenditures for the Project	Impact Fee Appropriations through FY 2019 (H.3)	Total All Appropriations through FY 2019 (H.3)	% of Project Funded with Impact Fee to date (E)	Impact Fee Funding deposit	Other Funding Sources (H.3)
OP	Transit Operations	On-going	N/A	21,000,000	2,102,506	-	**2,102,506**	21,000,000	10%	FY 2015 to FY	Prop A and C Local Return Funds
7504	Traffic Signal Improvements at Pasadena	Completed	FY 2017	208,900	97,570	137,424	100,000	208,900	48%	FY 2015	HSIP Grant, Gas Tax
7504	Detection of Bicycles at Intersections Controlled by Traffic	Completed	FY 2018	2,668,730	75,000	2,373,517	75,000	2,668,730	3%	FY 2016	Measure R Local Return Fund, MTA CMAQ Grant, Private Capital, TDA Article 3 Fund
7570	No. Marengo Ave Bicycle Boulevard	Completed	FY 2017	519,961	19,961	19,961	19,961	519,961	4%	FY 2017	Gas Tax, Bicycle Transportation Account Grant
7571	Traffic Mitigation Improvement	Completed	FY 2017	746,816	55,816	633,100	55,816	746,816	7%	FY 2017	Playhouse Parking Fund, Private Capital
7571	Traffic Lt Synchro Hill Ave	Completed	FY 2017	108,632	7,474	7,474	7,474	108,632	7%	FY 2017	Gas Tax, Prop1B, Private Capital
7571	Traffic Lt Synchro Orange Grv	Completed	FY 2017	246,546	7,546	7,546	7,546	246,546	3%	FY 2017	Gas Tax, Prop1B, Private Capital
7571	Traffic Lt Synchro Sierra Madr	Completed	FY 2017	159,606	16,606	16,606	16,606	159,606	10%	FY 2017	Gas Tax, Prop1B, Private Capital
7571	Traffic Lt Synchro Del Mar Blv	Completed	FY 2017	182,449	6,449	6,449	6,449	182,449	4%	FY 2017	Gas Tax, Prop1B, Private Capital
7591	Intelligent Transportation System (ITS) Project Phase II	Completed	FY 2019	3,394,398	40,398	1,902,692	40,398	3,394,398	1%	FY 2019	MTA Prop C Grant, Private Capital
7507	Mobility Corridor ImproveFY 2016-20	Planning & Design	FY 2020	421,861	29,222	241,035	100,000	371,861	24%	FY 2016 & FY	Gas Tax, Private Capital
7507	Complete Streets - Lida St	Project Closeout	FY 2019	325,000	189,004	314,004	200,000	325,000	62%	FY 2019	Gas Tax
7505	Complete Streets - Cordova St	Planning & Design	FY 2021	3,076,342	-	420,014	100,000	2,726,613	3%	FY 2019	Gas Tax, Measure R Local Return Fund, MTA STIP
7508	Complete Streets - Union Street Cycle Track Phase I	Planning & Design	FY 2021	6,878,877	204,575	493,575	225,400	1,802,763	3%	FY 2019	MTA CMAQ Grant, ATP Grants, Measure R Local
7570	Transit Maintenance Facility	Planning & Design	TBD	33,000,000	1,483,454	1,508,454	**2,185,000**	2,185,000	7%	FY 2015 & FY	Balance to be determined
7591	ITS Master Plan Phase III	Construction	FY 2019	5,417,565	195,151	4,218,357	336,243	5,417,565	6%	FY 2016	Gas Tax, Measure R Local Return Fund, MTA Prop C
7508	Safety Enhancements at Lincoln/Forest and	Construction	FY 2019	1,275,000	51,258	204,378	320,000	954,040	25%	FY 2018	HSIP Grant, Measure R Local Return Fund, Balance to be determined
7509	Left Turn Signal Phasing at Fair Oaks and	Planning & Design	FY 2020	160,000	419	419	120,000	160,000	75%	FY 2017	Old Pasadena Parking Meter Fund
7509	Implement Bus Signal Priority System on	Planning & Design	FY 2021	1,447,191	9,121	29,355	46,320	1,447,191	3%	FY 2018	MTA Prop C Grant, Prop A Capital Reserve
7509	Adaptive Traffic Control Network	Planning & Design	FY 2021	2,071,766	15,314	29,965	414,353	2,071,766	20%	FY 2018	MTA Prop C Grant
Total				**83,309,640**	**4,606,844**	**12,564,326**	**6,479,072**	**46,697,837**			

Response to MHNA
February 5, 2020
Attachment C

M A D I S O N H E I G H T S

686 South Arroyo Parkway Suite 199 Pasadena, CA 91105 www.mhnapasadena.org

January 6, 2019

Mayor Tornek, City Council, and Planning Department
Pasadena City Hall
100 N. Garfield Ave
Pasadena, CA 91101

RE: PRISM Engineering's "Traffic Engineering Review" of 253 South Los Robles Project and Related Traffic Issues

Dear Mayor, City Council, and Planning Department,

The Board of Directors of Madison Heights Neighborhood Association (MHNA) respectfully submits a traffic engineering report prepared by registered CA Traffic Engineer, Grant P. Johnson, TE, for your review. This traffic engineering report raises several questions and provides information you should consider while deciding to approve the CEQA exemption for 253 South Los Robles. In summary, the traffic engineering review of 253 South Los Robles identifies the following deficiencies and concerns, which are further explained in detail in the report (see attached report):

1. Level of Service (LOS) is not dead as an analysis tool. The vast majority of cities and counties, and even Caltrans, still use LOS of traffic operations as a required metric to determine the quality and efficiency of a transportation system, regardless of CEQA requirements.
2. Nearly ALL cities and counties have strict traffic study guidelines that require assessment of intersection LOS conditions, and to address all needed mitigations for vehicles, bikes, pedestrians, and transit to operate at an acceptable LOS. This requires use of the latest calculation methods.
3. The City traffic study guidelines state that HCM methods are to be used for LOS calculations, but the DOT traffic study uses an outdated intersection LOS calculation method, based on non-Highway Capacity Manual (HCM) methods from more than 20 years ago.
4. The City does not use HCM 2000 methods or even HCM 2010 methods in calculating the LOS, and the results differ from driver experience, are inaccurate and outdated.
5. Mitigations recommended by City staff to require new bike racks is good to encourage riding of bikes, but these kinds of improvements do not address the impact from the anticipated vehicle traffic, still not mitigated. Ignoring the Net New Trips that cumulatively increase traffic is a mistake because safety can be compromised. When traffic conditions worsen, drivers take more chances in aggravated delays, and safety can be compromised. Accidents may increase.
6. Safety IS covered in the CEQA EIR process as an official impact, to be addressed in the EIR.
7. There needs to be a safety assessment of the traffic increases. Accident history can reveal safety issues that would be aggravated by increases in traffic, and accident history must be addressed. (Have fatalities increased as of late? etc.).

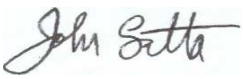
8. The City of Pasadena should be looking at safety in the EIR process, as well as the traffic study process.
9. The California Governor's Office of Planning and Research reveals that lower speeds of vehicles on roads results in dramatically fewer pedestrian fatalities (5% risk at 20 mph vs 100% risk at 50 mph). This level of safety detail is not covered in the City's traffic study (which focused on intersection LOS using an older method).
10. The City's Traffic Reduction and Transportation Impact Fee (TR/TIF) identifies the priority purchase of $98,872,426 worth of new buses (about 200 new buses) all paid for 100% by the TIF fee. However, there is no logical "nexus" as required by law, between the purchase of a bus, and the impact made by a project. In other words, how do additional buses mitigate new vehicle impacts?
11. The Mitigation Fee Act (Government Code Sections 66000-66025) AB 1600 requires that cities must show a reasonable relationship (nexus) between exacted mitigation funds for a project, and the said traffic impacts caused by new project.
12. The planned bus purchases represent 50% of the total capital improvement cost. A much lesser amount is allocated towards roadway improvements that could help mitigate traffic on the road.
13. Can the mitigation fees be better allocated to future real mitigation related to vehicles, peds and bike facilities? More directly related to the nexus of specific project(s) impact?
14. The City's traffic model has limited precision built into it. It is appropriate for the calculation of VMT totals for the City. However, it is not appropriate for specific project traffic assignment or the resulting intersection LOS analyses.
15. The City's traffic model does not have "parcel level" precision (as stated by former DOT Director), but only major block level precision, and is broad-brush in nature.
16. The 20 various driveways on the four block faces in the City's model containing the project (including S. Euclid Ave) are not represented in the model. The model generically represents these with a few aggregate driveways. The model could "choose" to assign all traffic through only one of these block face connectors. The intersection turning movement precision is not there.
17. Manual assignments of project traffic, by a traffic engineer, should be performed in traffic studies so that trip distribution and project impacts can be properly analyzed based on real world conditions, using engineering judgment of what is possible/reasonable in each project's case.
18. There are now long lines of congested traffic going northbound on S. Los Robles past the project site in the morning.
19. It is not reasonable that the project traffic could turn left in the peak hour as shown in the City's traffic study since there will not be a gap in the stop and go traffic. The project traffic is much more likely to turn right to go south out S. Los Robles and find another way to various destinations.

MHNA believes there is oversight on the City's behalf for not recognizing the need for a cumulative traffic report to study the increase in vehicle trips generated by several projects within the Los Robles corridor, instead opting to consider each project's newly generated vehicle trips separately. We have found with the additional information discovered in this new traffic engineering review that even the technical methods used in the City's traffic study procedures raise serious concerns in the validity of the study results. MHNA questions the existing volume for Los Robles and Del Mar and the lack of a vehicle cap creating a threshold of what the streets can withstand. MHNA believes the combination of all these future projects will in fact add significant impact to our neighborhood connector street of Los Robles and

therefore should trigger a stronger and more thorough investigation by DOT, such as an independent traffic study prepared according to standard best practices, and using engineering judgment in evaluation of a project's future impacts to the local street system. Lastly, 253 South Los Robles cannot be found to be exempt from CEQA because safety issues have not been studied or addressed. The high levels of traffic congestion mixing with pedestrians and bikes combined with road design issues must be evaluated. An EIR would look at all these issues specifically and the traffic study portion in the EIR would go beyond the VMT air quality component.

As our bylaws state, it is our duty as a board to oversee city government when Madison Heights and adjacent neighborhoods are threatened by civic planning decisions, including excessive development.

Thank you for your consideration,



John Latta
President, MHNA

TRAFFIC ENGINEERING REVIEW

253 SOUTH LOS ROBLES PROJECT AND RELATED TRAFFIC ISSUES

CITY OF PASADENA, CA

PREPARED FOR:

MADISON HEIGHTS NEIGHBORHOOD ASSOCIATION, MHNA

656 S. ARROYO PARKWAY, SUITE 199

PASADENA, CA 91105

January 8, 2020

Prepared by:

PRISM ENGINEERING
Traffic Engineering & Transportation Planning

This review has been prepared and certified by Grant P. Johnson, TE, Principal. Lic #1453

This report addresses several traffic engineering related issues surrounding the proposed project called 253 S. Los Robles, in the City of Pasadena. The following four items are addressed in this review:

I. Is Level of Service (LOS) Dead as an Analysis Tool?

II. Mitigation Requirements as per The Traffic Reduction and Transportation Impact Fee (TR/TIF)

III. Use of Traffic Model to Determine VMT and Traffic Impacts

IV. 253 S. Los Robles Project, Specific Traffic Study Issues

I. Is Level of Service (LOS) Dead as an Analysis Tool?

This has been a confusing topic throughout California. The answer is, no, it has not been eliminated, and is still a superior analysis tool to determine the Level of Service (LOS) for all modes of traffic including vehicles, pedestrians, and bicycles, at an intersection or along a roadway section. The software to determine this LOS metric is sophisticated, highly developed, and reliable. The vast majority of cities and counties, and even Caltrans, still use LOS as a required metric to determine the quality and efficiency of a transportation system. As a general rule, drivers react to excessive delays to save time, make more risky lane changes, some run red lights to get through. These behaviors compromising safety to all users of a transportation system (including vehicles, bikes, and pedestrians) are a byproduct of an inefficient and delayed transportation system. Cities and counties are requiring development to mitigate their traffic impacts, in addition to what may be required in an EIR process. Nearly ALL cities and counties have a traffic study guidelines document that requires assessment of LOS conditions, and the traffic study report for development must address all needed mitigations for vehicles, bikes, pedestrians, and transit. All four areas are covered in these required reports.

People have come to identify over the decades with a ranking system from A to F to describe the amount of delay, F being the worst condition. Simply spoken, if at an intersection a motorist is delayed less than 10 seconds on the average, then LOS A conditions exist. If there is more than 80 seconds of delay on the average, then LOS F exists. It is really simple. These metrics were developed with much research by the Federal Government and Transportation Research Board, and have been adopted nationwide, and I can say, are even being used worldwide as a common metric. It is not outdated as a metric.

The confusion over LOS in California comes in when there is an EIR required. California legislation has determined that using LOS, or average delay (whether it be for a car, a bike, or a person), is no longer an acceptable metric in the environmental impact report process. The acceptable metrics to evaluate impacts include air quality, vehicle miles traveled (VMT), noise, safety, etc. These metrics used in the EIR process are more compatible with the prospect of getting hi-rise or high-density development approved in fully developed areas where traffic conditions are already at or exceeding capacity. This was really the reason to eliminate LOS as a metric in the EIR, because the LOS F conditions commonly calculated for a large project's traffic impacts could hardly ever be financially mitigated sufficiently to achieve a satisfactory LOS result. Mitigations were impossible using the LOS metric, so it was eliminated in order for more transit, walking, and biking, to be the mitigation instead.

But does this improve the traffic situation? This is a hotly debated topic, and the answer is generally, no, it does not eliminate LOS F conditions where they exist. In fact, ignoring traffic impacts in the EIR actually

makes things worse for traffic. When approvals are made for projects even when traffic conditions are unacceptable, the new project will add even more vehicles to the road, and the result is even worse traffic conditions. Typical ramifications of ignoring traffic impacts include longer lines of traffic waiting at intersections, drivers waiting through more signal cycles, and more intense turning movement conflicts at intersections involving vehicles, pedestrians and bikes. Light rail too can exacerbate conflicts of these turning movement conflicts at intersections.

The elimination of LOS and delay from an EIR does not mean that a city, a county, or even a state can eliminate the need to create and maintain an efficient transportation system. Why else would we still be using traffic signals in every city if efficiency was not important? Why not just use a Stop Sign instead? The answer is, it is important and cannot be ignored.

When a project is evaluated in the EIR process, the analysts will take a look at traffic numbers as a part of the overall process. But often in the EIR process, the "mitigations" being required as a result of traffic impacts are not related to the project itself. For instance, adding bike racks is a good mitigation, but it does not address the additional traffic from a new project that has Net New Trips. To ignore the net new trips is a mistake because there is a safety factor or component to all of this. When traffic conditions worsen, drivers take more chances, delays are aggravating the situation, and safety is compromised.

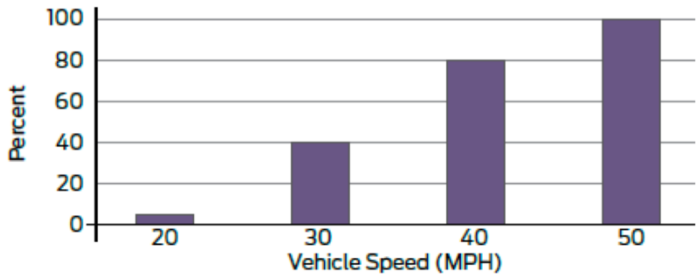
It is important to take a look at safety, because safety IS covered in the EIR process as an impact. However, the connection to traffic is not allowed as a default, in other words, there needs to be data or some history to show an unsafe condition (such as an increase in traffic accidents, or even the severity of the traffic accident. Have fatalities increased as of late? etc.). The City of Pasadena should be looking at safety in the EIR process.

From the California Governor's Office of Planning and Research comes the following chart:

Reducing Speed and Increasing Driver Attention

Vehicle speed plays a fundamental role in transportation safety. The NACTO Urban Street Design Guide, reports: "Vehicle speed plays a critical role in the cause and severity of crashes." The chart below shows increased pedestrian fatality risk associated with higher motor vehicle speeds.

Risk of Pedestrian Fatality by Auto Speed



Source: Federal Highway Administration

http://opr.ca.gov/docs/OPR_Appendix_B_final.pdf

This chart indicates that lower speeds of vehicles results in less pedestrian fatalities. Pedestrians also play a part in improving safety by refraining from J-walking, or assuming that being in a cross walk even with a green light means you are safe. The same is true for drivers of vehicles who may think that a green light means they are safe to proceed. Looking both ways is safety practice for all modes of travel. As long as

cities mix traffic modes (cars, bus, bikes, and pedestrians), there will be safety issues due to human behavior. An EIR needs to consider issues of safety, as a requirement. Separate traffic impact studies also need to look at safety even if an EIR is not required. In these studies, it is required to determine if local accident rates are increasing, if LOS is poor, or if there are some other transportation improvements that are needed. A commonsense engineering judgment approach is needed to prepare a traffic study where several aspects of transportation are considered, including design, safety, LOS, efficiency, signal operations, presence and adequacy of pedestrian and bike facilities, where bus stops should be installed, etc.

Measuring traffic conditions and level of service through software can show where problem locations are, and more often than not, an unacceptable LOS at an intersection is an indication of a potentially unsafe location (because of the driver aggression/competition, cyclist aggression/competition, and even pedestrian impatience trying to navigate through the delays. People take more chances under such conditions). Some drivers will push the limits to get through an intersection as the light turns red, and if high speeds are involved, safety is compromised for non-vehicular traffic.

II. Mitigation Requirements as per "The Traffic Reduction and Transportation Impact Fee" (TR/TIF)

The City's current transportation impact fee program amended by the city on July 24, 2017, requires that new development pay for their net new traffic trips onto the road. So, if a project is a redevelopment project, the net new trips would be the proposed project vehicle trips minus the number of vehicle trips that would have taken place at the existing project site if the business or development were currently functioning. Typically, abandoned properties are redeveloped, and local traffic volumes have already adjusted due to the lack of traffic. So, when a new development comes online, even when their net new trips are low, the full impact of those projects is felt on the street system. The full trip generation of the project is realized by the drivers that already use those roadways. In my view, new/additional traffic from an infill redevelopment project can be as significant as when a brand-new vacant lot is developed, especially when a proposed infill lot has been vacant or abandoned for some time.

Within the document that describes the City's transportation impact fee program, there is an "Attachment A" table from this fee program as follows, which describes various capital improvement projects that are anticipated up until the build out of the City's general plan to the year 2035. What caught my eye in this summary table of facilities needed for future development, is the first line item in blue for a local transit improvement identified as the purchasing of new buses to support the general plan. $99 million, or 50% of the total fees collected, have been allocated to the purchasing of new buses in this table, with 100% funding of these coming from the traffic impact fee program. Most traffic mitigation fee programs do not include purchases of buses, but are used instead for new signals, bike lanes, and other improvements to the physical transportation system, such as a bridge, new road, widened road, or better pedestrian facilities if the nexus can be shown. Part of this is because of California law, AB 1600, which stipulates how these mitigation fee programs are to be administered. The nexus between the purchase of about 200 new buses in the next 15 years, which will also create an impact to traffic (and may not run fully occupied most of the time), and the very real traffic impacts of a new project, seems to be dubious. Other fully built-out cities in California that I have researched, do not place the purchases of buses into their traffic impact mitigation fee program, presumably because the nexus just isn't there (for instance, how

does a new bus mitigate in any way, the traffic impacts from new cars impacting the roads? It in fact adds to the traffic impact if drivers don't stop driving their cars in turn[1]).

Attachment A: List of Transportation Improvements Funded Through the Fee

FACILITIES NEEDS LIST COSTS FOR FUTURE DEVELOPMENT

Allocation	Category	Project Description	Preliminary Project Costs (Original Needs List)	% Funded by Impact Fee Program*	Final Project Costs (paid for by Fee Program)
NEW DEVELOPMENT ONLY	Local Transit Improvements	New Buses to Support General Plan (net over existing)	$98,872,426	100.0%	$98,872,426
NEW DEVELOPMENT ONLY	Local Transit Improvements	Facility to Support General Plan (net over current proposed)	$20,000,000	100.0%	$20,000,000
NEW DEVELOPMENT ONLY	Complete Streets	Citywide Complete Streets Program FY 2016 - 2020 (75076)	$750,000	100.0%	$750,000
NEW DEVELOPMENT ONLY	Complete Streets	Complete Streets Project - Cordova Street from Hill Ave to Arroyo Parkway (75052)	$400,000	100.0%	$400,000
NEW DEVELOPMENT ONLY	Complete Streets	Citywide Complete Streets Program FY 2016 - 2020 (75076)	$552,000	100.0%	$552,000
NEW DEVELOPMENT ONLY	Complete Streets	Complete Streets Project - Lida Street between Knollwood Dr. and Lancashire Pl. (75074)	$94,000	100.0%	$94,000
NEW DEVELOPMENT ONLY	Complete Streets	Washington Road Diet	$870,000	8.6%	$74,887
NEW DEVELOPMENT ONLY	Complete Streets	Orange Grove Road Diet	$2,300,000	8.6%	$197,978
NEW AND EXISTING	Traffic Ops	Intelligent Transportation System (ITS) Project - Phase I(75701)	$4,198,961	8.6%	$361,436
NEW AND EXISTING	Traffic Ops	Detection of Bicycles at Intersections Controlled by Traffic Signals (75043)	$2,494,505	8.6%	$214,721
NEW AND EXISTING	Traffic Ops	Gold Line Phase I - Project Enhancements (75506)	$6,686,908	8.6%	$575,593
NEW AND EXISTING	Traffic Ops	Mobility Corridor Improvements FY 2016 - 2020 (75079)	$274,000	8.6%	$23,585
NEW AND EXISTING	Traffic Ops	Traffic Signal Indication Safety Improvements - Phase II(75709)	$770,000	8.6%	$66,280
NEW AND EXISTING	Traffic Ops	Left Turn Signal Phasing at Fair Oaks Ave and Colorado Blvd	$160,000	8.6%	$13,772
NEW AND EXISTING	Traffic Ops	Mobility Corridors - Rose Bowl Access Systems (75084)	$1,623,000	8.6%	$139,704
NEW AND EXISTING	Traffic Ops	Intelligent Transportation System (ITS) Equipment Upgrades/Replacement - FY 2016 - 2020 (75078)	$375,000	8.6%	$32,279
NEW AND EXISTING	Traffic Ops	Implementation of Citywide Transportation Performance Monitoring Network (75602)	$3,132,428	8.6%	$269,632
NEW AND EXISTING	Traffic Ops	Intelligent Transportation System (ITS) Master PlanImplementation Phase III (75911)	$5,417,565	8.6%	$466,331
NEW AND EXISTING	Traffic Ops	Upgrade Traffic Signal Heads on One-Way Streets (75050)	$384,500	8.6%	$33,097
NEW AND EXISTING	Traffic Ops	Implement Bus Signal Priority System on Pasadena TransitBuses	$1,447,191	8.6%	$124,571
NEW AND EXISTING	Traffic Ops	Adaptive Traffic Control Network - Phase II	$2,502,572	8.6%	$215,415
NEW AND EXISTING	Traffic Ops	Traffic Signal - Orange Grove Blvd. at Sunnyslope Ave.	$500,000	8.6%	$43,039
NEW AND EXISTING	Traffic Ops	Traffic Signal - Electronic Dr. and Sierra Madre Villa Blvd.	$500,000	8.6%	$43,039
NEW AND EXISTING	Traffic Ops	Replacement of Aging Video Detection Systems	$510,000	8.6%	$43,900
NEW AND EXISTING	Traffic Ops	Traffic Signal Improvements at Garfield Ave and Washington Blvd	$485,000	8.6%	$41,748
NEW AND EXISTING	Traffic Ops	Actuated Traffic Signal Upgrade (CIP)	$5,600,000	8.6%	$482,034
NEW AND EXISTING	Bike Plan	Pasadena Bicycle Program	$12,300,000	8.6%	$1,058,754
NEW AND EXISTING	Pedestrian Improvements	Mid-Block Crossing for Old Pasadena	$3,866,052	8.6%	$332,780
NEW AND EXISTING	Pedestrian Improvements	Mid-Block Crossing for Playhouse District	$1,762,688	8.6%	$151,728
NEW AND EXISTING	Pedestrian Improvements	ADA ramp improvements	$21,000,000	8.6%	$1,807,628
		Total Transportation Improvement Project Cost:	**$199,828,796**		**$127,482,356**

What also is interesting in this table is the 8.6% funding for all other projects (shown in green) from the mitigation fee, without an explanation of where the remaining 91.4% of the project cost will come from, or whether it is even feasible.

Development Impact Fees in California: THE LAW

The Mitigation Fee Act (Government Code Sections 66000-66025) came from Assembly Bill 1600. This law requires that a city must show a reasonable relationship (nexus) between exacted mitigation funds for a project, and the said traffic impacts caused by new project. In other words, if a project impacts an intersection and it operates at a poor level of service as a result, a city should require mitigation of said project in the form of a traffic improvement fee. The following is required of the city:

I. Identify the purpose of the fee;
II. Identify the use to which the fee is to be put;
III. Determine how there is a reasonable relationship between the need for the public facility and the type of development project on which the fee is imposed;
IV. Determine how there is a reasonable relationship between the amount of the fee and the cost of the public facility or portion of the public facility attributable to the development on which the fee is imposed.

[1] **source: https://ops.fhwa.dot.gov/publications/fhwahop08054/sect4.htm

If the government doesn't make adequate findings connecting the fee and the impact, the fee may be subject to challenge as an illegal, non-voter-approved "special tax".

Transit Subsidies in the United States, the most common form of taxation for transit is the SALES TAX. In states as ideologically diverse as California, Texas, and Washington, statewide sales taxes provide the lion's share of transit subsidies. But in California, transit use is way down in recent years. Rather than a shift towards riding buses, the exact opposite is happening. Services such as Uber, riding bikes, even walking, etc., are making an impact on need for buses.

The following report on transit use comes from Transit California:

> **Falling Transit Ridership**
>
> **New Report from UCLA ITS Scholars Investigates Factors**
>
> Many California communities are banking on more transit use to address problems of congestion and climate change. Yet despite heavy investments in public transportation over the past 15 years, transit ridership is declining — from 2012 to 2016, California lost 62.2 million annual transit rides, and the six-county Southern California Association of Governments (SCAG) region lost 72 million annual rides, 120 percent of the state's total losses.

source: https://caltransit.org/news-publications/publications/transit-california/transit-california-archives/2018-editions/february/falling-transit-ridership/

III. Use of Traffic Model to Determine VMT, Traffic Impacts

The City of Pasadena has a TRANSPORTATION IMPACT ANALYSIS TIA CURRENT PRACTICE & GUIDELINES CP&G document that defines the process of analysis for new projects.

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Table 3 (right) shows, that for non-CEQA traffic study situations, there are four (4) areas of analysis that need to be covered in the traffic study. This includes item #2 which address "Auto Level of Service" based on the industry standard Highway Capacity Manual (HCM).

Table 3- Metrics' Cap Outside of CEQA

	METRIC	DESCRIPTION	CAP
1.	Street Segment Analysis	The street segment analysis assesses traffic intrusion on local streets in residential neighborhoods	Increases of 10-15% above existing on streets with more than 1500 ADT would trigger conditions of approval to reduce project vehicular trips
2.	Auto Level of Service	Level of Service (LOS) as defined by the Transportation Research Board's *Highway Capacity Manual (HCM).*	A decrease beyond LOS D Citywide or LOS E within Transit Oriented Districts (TODs) would trigger conditions of approval to reduce project vehicular trips
3.	PEQI	Pedestrian Environmental Quality Index	Below average Conditions
4.	BEQI	Bicycle Environmental Quality Index	Below average conditions

source of Table 3: Pasadena DOT

https://ww5.cityofpasadena.net/transportation/wp-content/uploads/sites/6/2015/12/Current-Practice-and-Guidelines.pdf

VMT vs LOS. Is LOS Dead?

LOS is not dead. Even Pasadena still uses LOS as a metric (for non-CEQA analysis, which happens to be most analyses). Even though Pasadena's methods for calculating LOS at intersections is outdated, based on older Intersection Capacity Utilization (ICU) methodology, DOT still calculates LOS at intersections that might be impacted by a project. It is a requirement of the City's TRANSPORTATION IMPACT ANALYSIS CURRENT PRACTICE & GUIDELINES document. However, LOS is dead in a strict CEQA context. In other words, by new law in California, CEQA transportation assessment is limited to VMT only, and LOS or vehicle delay is no longer considered an "environmental impact." Driving more or less miles is considered to have a direct impact on air quality, global warming, etc.

VMT or vehicle miles traveled, is now a transportation metric that is used to determine how many miles are driven by residents of a city, or a state, or of a project, or of a specific neighborhood, or project site. The calculation of VMT is complicated and intensive, and therefore a traffic model computer program is best suited to quickly give this answer, as this feature is built-in to most citywide traffic demand models. The City of Pasadena has such a traffic model which can accurately determine VMT totals for the entire city, and then that number can be compared with a revised VMT after a certain project is added to the model. Depending on assumptions, the VMT will either go up or down, where going down is the ideal result. Land use changes can also be plugged into the traffic model, and the analyst can determine if the change reflects better or worse on overall VMT.

The problem with VMT is that it is a very "macro level" metric (generally relating to a broad-brush citywide condition), and does not in any way begin to predict better or worse traffic conditions at an intersection or a roadway segment. Traffic conditions at intersections or along street segments still need to be analyzed using traditional Highway Capacity Manual (HCM) methodologies, which require intersection turning movement counts. The City of Pasadena's TRANSPORTATION IMPACT ANALYSIS CURRENT PRACTICE & GUIDELINES specifies in Table 3 the acceptable level of service threshold maximum values (caps) as the following intersection condition:

> *"A decrease beyond LOS D Citywide or LOS E within Transit Oriented Districts (TODs) would trigger conditions of approval to reduce project vehicular trips."*

What this means is that LOS D is the standard in the City for intersection level of service, but LOS E is allowed for areas that are within a transit-oriented development (TOD), where typically higher densities of development would be taking place.

IV. 253 S. Los Robles Project, Specific Traffic Study Issues

City's Traffic Analysis Method Needs Calibration

Several residents who live in the vicinity of the project site, 253 S. Los Robles, have anecdotal information about their experience in traveling through congested intersections during the peak hour time periods. Specifically, they have said that two or three signal cycle waits are experienced. Since a signal cycle is typically around 70 to 80 seconds at intersections in the study area, a wait time for three signal cycles would be around 200+ seconds. Since an 80 second delay is already considered LOS F conditions, the person who waits more than one signal cycle is definitely experiencing aggravated LOS F conditions.

However, in the 253 S. Los Robles traffic study prepared by DOT, all intersections whether it be AM or PM peak hours, are shown to be at LOS B conditions at all S. Los Robles intersections. How does this disparity in real world conditions comport with the analysis result? The only explanation is that the assumptions used in the analysis are either outdated, have incorrect signal timing or configuration information, or the peak hour factors of traffic are incorrect. The older methodology being used by the City (ICU vs HCM 2010) is not sensitive to these details. The Synchro 6 Intersection LOS being used by the City is based upon a "percentile" control delay computation but uses the same numerical delay thresholds as the HCM**. The percentile control delay is different than the HCM control delay for the intersection. The fact remains, the DOT report says LOS B conditions exist, and residents are saying LOS F conditions exist during peak time periods for S. Los Robles traffic, and that there are long lines of cars waiting to get through signalized intersections.

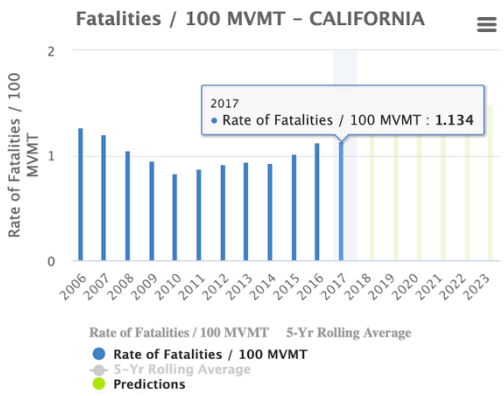
A complete field survey, observing traffic operations and driver behavior in the real world is needed to verify conditions, along with utilizing of detailed traffic data such as saturation flow rate (SFR) and peak hour factors (PHF) which generally cause a realistic and worse LOS calculation compared to when they are not considered (such as in the City's ICU methods). PHF helps identify the congestion that takes place for say, school traffic in the morning but may only last for 30-40 minutes, and not the whole hour.

**source: https://ops.fhwa.dot.gov/publications/fhwahop08054/sect4.htm

Technical Summary of Software Deficiencies in Study

The Transportation Impact Analysis Outside of CEQA Analysis prepared for the 253 S Los Robles project, dated Feb. 6, 2018, utilized a methodology other than the methods typically used today for Item #2 in Table 3 above. In that table, the "Auto Level of Service" is said to be calculated using methods contained in the HCM, as defined by the Transportation Research Board (TRB). The latest methods of the TRB are outlined in the HCM 2010 document, and contained in the latest version of the Synchro software, version 11 released last year in 2018. The City uses a much older and outdated version 6 of this software (from year 2008), and which does not have HCM 2010 features. This older version used by Pasadena DOT today utilizes a Synchro method based on older calculation methods used in the 80's and 90's and does not incorporate the latest HCM 2010 methods which allow for more detail and accuracy of peak traffic. This method does not involve Vehicle Miles Traveled (VMT) in any way. Synchro calculations are based on signal timing operations, and a one-hour peak volume of traffic with peak hour factors, NOT an average of different hours or different days, but the worst-case peak condition at an intersection, determined by real-world turning movement counts. The highest one-hour time period during the entire week is to be used so that the worst-case conditions can be considered for maximum optimization. This is the norm throughout the State. However, in Pasadena this method is largely ignored as a meaningful metric for mitigation purposes, despite its common use for mitigation guidance in the vast majority of cities and counties in California, inclusive of even State Caltrans facilities. LOS and intersection operations matter because they have a direct relationship to safety. Accident rates increase as congestion increases, as is shown by an examination of the data pertaining to population growth and accident rates over the past decade. 50% of serious collisions happen at intersections. In California, the statewide accident rate of fatal accidents has been increasing steadily since 2010 (starting at 0.836 per million vehicle miles traveled,

up to 1.134 in 2017)[2]. Why the increase? Congestion is also increasing, especially at signalized intersections where studies have shown 83% of fatal accidents in an urban city take place at a signalized intersection[3]. This is why it is imperative to find solutions to safety at intersections. Because of this trend in California where the accident rate of fatal accidents has been increasing, even as the population of California[4] has also increased from 37.3 million people in 2010 to 39.4 million in 2017, the obvious correlation of higher number of cars/vehicles and the frequency of accidents is undisputed. The accident rate has not remained the same. When the accident rate increases, as it did in California from 2010 to 2017, this is an indicator of a correlation between the number of cars on the road (congestion) and the increasing probability of a serious or fatal accident. California roads are becoming increasingly congested, and the statewide fatality accident ***rate*** is going up, indicating that increased congestion correlates with increased probability of fatality, especially at a signalized intersection.



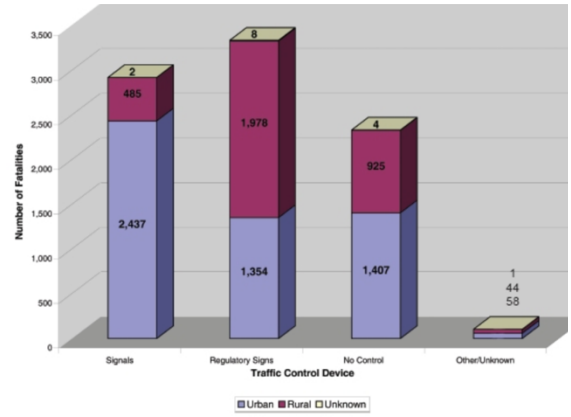


Figure 3: 2007 Fatalities at Intersections by Traffic Control Device

source: FHWA

For these reasons relating to accident safety, the current methods of traffic analysis being used in Pasadena are insufficient, using outdated software that underestimates congestion (yields LOS results in traffic reports that are more favorable than what field conditions would anecdotally indicate). Newer software should be used, with the latest research in data and analysis. In addition, the calculation results should be calibrated by engineering field review and survey.

Some Cities Have Been Making Evolutionary Shifts to Change the Status Quo of Transportation Basics

Despite how traffic has been analyzed for decades using LOS as the main metric to assess traffic impacts, previous DOT Director Fred Dock, recently retired, worked diligently to change that status quo in Pasadena, and instead focused on other metrics of analysis pertaining to 1) air quality, 2) VMT, and 3) travel mode shift away from cars. He stated in a recent Aug 2019 podcast[5] interview that during his tenure at the City of Pasadena, he worked with staff from the Governor's Office of Planning & Research (OPR). In studies the City conducted for signal timing optimization to improve efficiency in the system of signals, information was shared between OPR and the City. As a result of these improvement efforts to signal timing, they learned that traffic volumes at an intersection were able to increase (more efficient signal operations). He said he viewed it as a negative, because getting transportation funding for the City from

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[2] *Source: https://tims.berkeley.edu/tools/safetypm/*

[3] *Source: https://safety.fhwa.dot.gov/intersection/other_topics/fhwasa10005/brief_2.cfm*

[4] *Source: https://www.statista.com/statistics/206097/resident-population-in-california/*

[5] *source: http://www.pasadenanow.com/main/former-pasadena-transportation-chief-talks-city-planning-on-podcast/#.Xfx70i2ZPok*

outside state and federal sources related to transportation improvements, made eligibility for receiving funds contingent on a city's ability to demonstrate that they have made plans to *reduce* overall traffic volumes, not increase them. What happened in the City's signal timing improvements was not an increase in traffic volumes (they were already on the road!), but was an improvement to efficiency. However, the *hourly* traffic counts showed a higher number. For example, instead of it taking say, 70 minutes for 1000 drivers in Pasadena to get through a hypothetical congested intersection, these same 1000 cars got through in 60 minutes instead, on account of an improvement to a traffic signal's timing and efficiency. Traffic counts are always summarized by *hourly* totals. What happened in the signal timing study with OPR was that more traffic was able to get through affected intersections, in an hour. Mr. Dock said that what happens with these signal timing improvement was "you wind up inducing travel." This is a theory that Mr. Dock may espouse, but is not a proven fact, and would require extensive survey studies to determine if it were true for Pasadena. Since the population of Pasadena, does not change significantly, the same number of drivers are on the road day to day. Any "increase" in traffic volumes for an hour time period through a signal is not an induced traffic increase... it was the same people, just faster and shorter times. Signal timing improvements allow better efficiency for those that are already on the road.

Pasadena's traffic mitigation fee program is showing that about 200 future buses ($99 million cost) is to be paid for by the fee program, even though in nearly all other cities in California buses are purchased through various tax assessments instead. The reason for this is the lawful need for a direct nexus to be in place showing how traffic mitigation fees go to improve things that are impacted by a project. A bus system is a city benefit, but these do not reduce traffic or improve traffic flows. They are primarily an option for those that do not own a car, and a less convenient option for those who do. Therefore, the nexus between new development and the need for buses is not a direct link.

The reason that the nexus is lacking between the need for buses as a mitigation, and the direct additional traffic impacts that a project will have on the adjacent roadway, is because the software being used calculating VMT is not related to traffic congestion, but only how far vehicles drive (this is loosely associated with air quality improvements). Pasadena has been striving to evolve the City's examination of traffic away from LOS, safety, and congestion, to a focused look on how far drivers drive their cars as a whole (VMT). It is important to note that all VMT estimations come not from reality or a survey, but from a theoretical traffic model based on gravity equations (see next section). The VMT can never be proven and will always remain in the theoretical realm. VMT itself has never been calibrated to real world except sometimes at the most macro levels such as an average length of vehicle trip for "Journey to Work" census surveys, and this is only by County. Los Angeles County has a Journey to Work trip length of 29.3 minutes[6] on the average. In the City of Pasadena traffic model, a part of Los Angeles County, I observed that the longest "work trip" time (looking at the "friction factor curve") was tapering off at 20 minutes and shutting off any trip over 23 minutes, indicating that the City's model was ***not*** calibrated for work trip length even though there is statewide data as well as Countywide data from surveys. This is a very significant deficiency in the model when trying to estimate VMT.

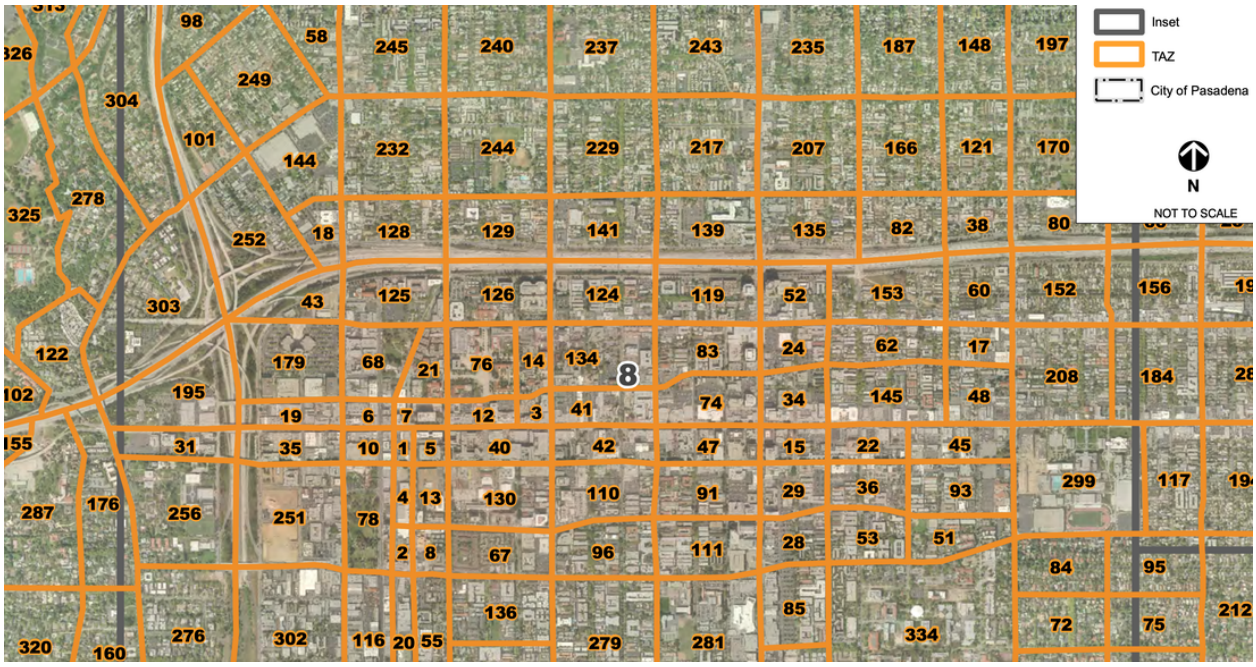
Use of the Traffic Model to Determine Traffic Impacts at Intersections is Incorrect

It is generally not appropriate to utilize a travel demand model tool to determine intersection turning movements, or to determine trip distribution assignments for a project, if the model is only accurate to macro level detail of roadway segments, not intersection turns. The City's traffic model has NOT been

[6] *Source: https://www.indexmundi.com/facts/united-states/quick-facts/california/average-commute-time#map*

calibrated to the turning movement level of traffic counts in the City's intersections. It has been generally calibrated to large link segments, like freeways and main roads, and can still have a 50% error max on some of these (considered acceptable by Caltrans, generally for Caltrans freeway and highway facilities) . The map that follows represents a snapshot of part of the City's travel demand model, in the study area near to where 253 S. Los Robles is proposed. All trips in the model are assigned ONLY from one of these orange boxes (called a TAZ or traffic analysis zone) to another orange box. Generally, one TAZ is residential based, and the destination TAZ's are non-home-based (such as office, industrial, commercial, retail, school, etc.). Trips are generally assigned from TAZs that contain homes, to TAZs that contain non-home land uses.

In the graphic below, taken from the *PASADENA TRAVEL DEMAND FORECASTING MODEL DEVELOPMENT REPORT* appendix (see link below), it can be seen that the 253 S. Los Robles proposed project would be in TAZ #67, and would represent only 5% of the total content of that zone. This TAZ 67 is large and includes two blocks of existing development bounded by S. Los Robles on the east, Cordova on the north, E. Del Mar on the south, and Marengo on the west. With this arrangement, the 253 S. Los Robles project could just as easily be directly assigned in the model randomly to any one of the four "block" faces of the TAZ.



City's Traffic Model TAZ Structure.
Source: City of Pasadena

This is not anywhere near precise or accurate enough to utilize model-generated turning movements at an intersections, or project trip distribution assignments for the very small 253 S. Los Robles project that is contained within a very small part of TAZ 67. The project is literally only 5% of the TAZ 67 total land uses, trip assignment is 95% influenced by the other land uses in the TAZ, and S. Euclid Ave even splits TAZ 67, so that the project could even potentially be assigned in the model directly to Marengo, let alone Cordova or Del Mar, which would not be correct.

TAZ 67 is very large, two blocks, part of a macro-level model. A micro-level model at the parcel level is necessary in order to have appropriate use in assigning traffic from potential projects. Since this level of parcel-based TAZ precision does not exist in the City's model, the model should not be used for assigning

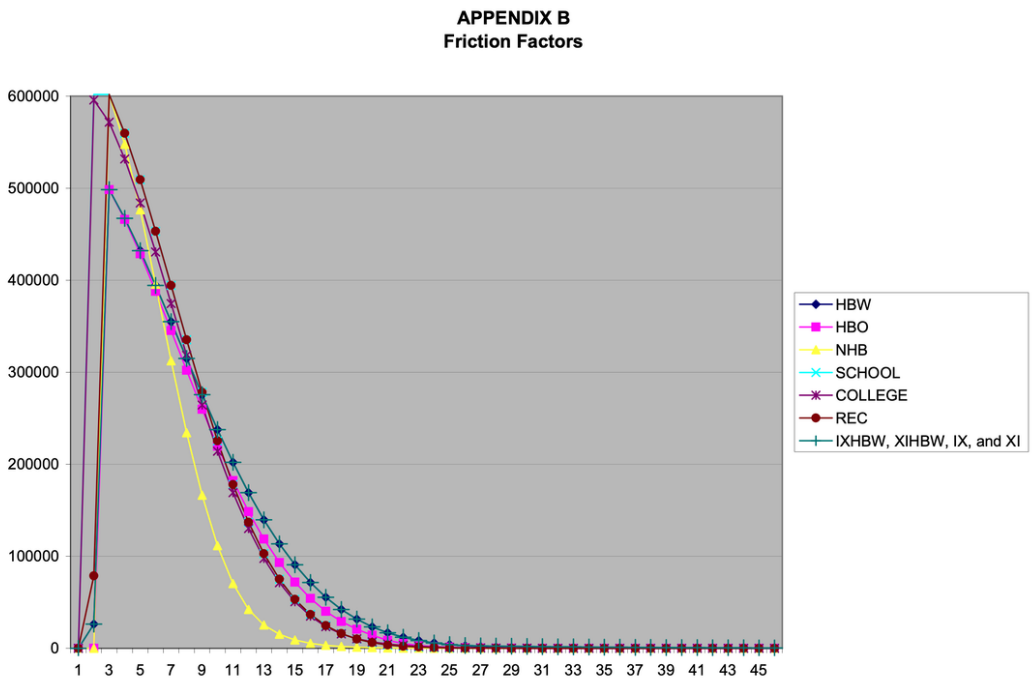
project traffic at the intersection level. The level of precision to do that is not built into the model. Project traffic should be assigned manually, by a traffic engineer, in performing the traffic study.[7]

In the context of an EIR process, the traffic model being used as a tool to determine traffic impacts (in terms of strict VMT only) is entirely appropriate and is now State law for CEQA to do so. The traffic model is used to calculate VMT for the City before and after a project is added to the model. This enables analysis to see the positive or negative effect that a project might have on air quality, greenhouse gas reductions, etc., since CEQA no longer requires traffic impacts (delay and LOS) to be studied. However, traffic related safety, or safety in general, *is* a CEQA impact that can be required in an EIR.

The City's travel demand model is an extremely limited tool to determine anything beyond the macro level predictions of volumes for roadways only (usually only can predict daily volumes, and are inaccurate for peak hour volumes). California State standards for travel demand models, set by Caltrans pertaining to the calibration of travel demand model, allows for very large errors... up to 50% error when compared to a real traffic count. Generally, these macro travel demand models best predict existing and future volumes for larger roads such as freeways, where no more than a 10% error is required to calibrate. In my experience creating and using numerous traffic models, the literal output from a software model predicting existing or future volumes may be significantly in error, and according to the guidelines this is OK. What is not good practice, however, is when outputs are used literally, without engineering judgment. The best practice is to take the percentage difference in a model between existing and future volumes (say it is 80% increase on a specific roadway), and to use that percentage to multiply against an existing/real traffic count. The resulting value would be used in the traffic study for analysis. It is the most common accepted practice in my dealings with government agencies all over California.

This assumption in the model, the "Friction Factor" curves (see figure below), represents how "attractive" (according to the "gravity model") a trip will be based on how many minutes it takes to get from one TAZ (traffic analysis zone, see orange boxes in figure above) to another. Notice that ALL trip categories and their curves are essentially the same values, which is not logical. All curves closely follow each other, the HBW curve (home to work), the School curve, etc. making different kinds of trips in the model no more attractive than the others... but in the real world, work trips are generally very long as most people don't live next to their place of employment, but school trips are much shorter, even neighborhood based where the child lives, as most neighborhoods have access to a nearby elementary school (that facilitates the possibility of walking).

[7] **Traffic from the project should be assigned manually, because the City's travel demand model does not have the sufficient precision to determine intersection turning movements, or to assign project traffic since the project traffic in the model could be assigned to one or more of four potential block faces of TAZ 67.*



"Friction Factor Curves" in the City's Traffic Model

In the figure above for friction factor curves[8], the way to interpret this chart is to first look at the bottom axis which represents minutes of travel. It can be seen that a 20-minute trip is near to the point at which all curves flatten out at zero (no longer attractive). Slightly over 20 minutes of travel time in the model there is zero "attractiveness" and so a 25-minute trip would never be assigned. Long trips are not possible. A 10-minute trip would have a friction factor value of about 220000. A 5-minute trip has a corresponding value of about 450000 for most curves. This means, a 5-minute trip in the model will be at least twice as attractive as a 10-minute trip. More traffic will be assigned from one TAZ 5 minutes away from another nearby TAZ (five minutes of travel time away).

Project Traffic Assignment, Incomplete Analysis...

Traffic from the project should be assigned manually, because the City's travel demand model does not have the sufficient precision to determine intersection turning movements, or to assign project traffic since the project traffic in the model could be assigned to one or more of four potential block faces of TAZ 67.

The traffic study showed a project traffic assignment as follows in the clip from Figure 3 of the report (below). Anecdotal information from residents who drive S. Los Robles on a regular basis indicates that there are currently long lines of traffic that back up on S. Los Robles in front of the proposed project site, and that the assumptions shown in Figure 3 could not happen, as there will not be a gap in traffic for project traffic to get out in the morning.

[8] *https://www.cityofpasadena.net/wp-content/uploads/sites/20/2362_Model_Development_Report_FINAL.pdf*

50% of the project traffic was assumed in the DOT study to make a left turn out of the project, presumably because the travel demand model showed this.

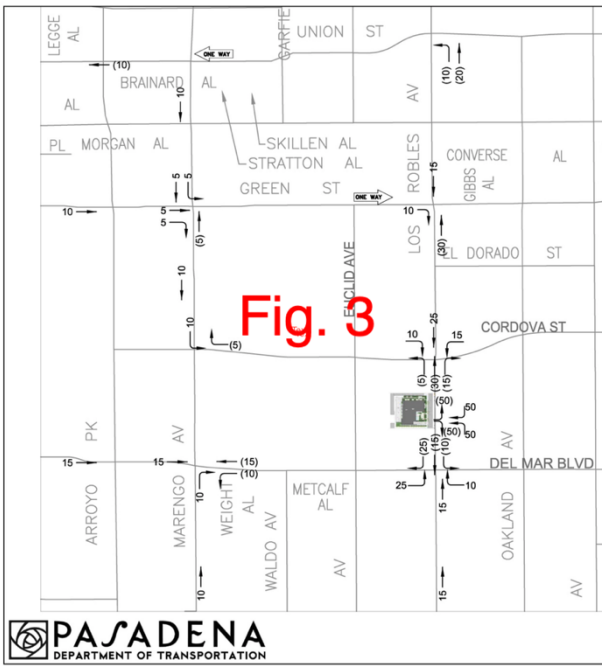


Fig. 3

A closer look at the figure shows project traffic patterns that raises questions... such as 50% of the project turning left out to go north on S. Los Robles in the morning when there are long lines of northbound traffic already on the road that would prevent this from being reasonable/possible (no sufficient gaps in traffic).

For these kinds of reasons, manual assignments of traffic, by a traffic engineer, should have been performed so that trip distributions are reasonable, and project impacts can therefore be properly analyzed, based on real world engineering judgment of what is possible/reasonable.

The levels of service calculated for the project in the DOT study cannot be relied upon as they currently exist, because the travel demand model was the source for project traffic assignment which did not consider real world constraints of existing congestion, signal timing, pedestrian totals, and related delays. A travel demand model is not capable of this level of precision, the kind of precision required when using software like the Synchro intersection analysis tool. The City did use Synchro, but the method of calculation used was not the HCM 2000 or HCM 2010 methodologies, as the City's traffic study guidelines requires.

Traffic was assigned for the project using the City's travel demand model, which does not have the level of precision built into it to accomplish this appropriately. It was last calibrated in the year 2011 and is based on 2009 counts for base conditions. Because of this lack of precision in traffic assignment between Traffic Analysis Zones (TAZs), the 253 S. Los Robles project traffic should have been assigned manually by a traffic engineer, based on engineering judgment of what is probable/reasonable. Given that there are long lines of congested traffic going northbound on S. Los Robles past the project site in the morning, it is not reasonable that the project traffic would turn left since there will not be a gap in the stop and go traffic. The project traffic is much more likely to turn right to go south out S. Los Robles and find another way to various destinations.


A 91-unit apartment building, proposed for 253 S. Los Robles Ave. in Pasadena, was rejected by the Pasadena City Council on July 23, 2019. Pasadena, California. (Rendering courtesy of the city of Pasadena)

Grant Johnson, TE, Resume/CV

Principal, Project Manager/Engineer

Grant Johnson is a Principal Engineer of PRISM Engineering and is the Project Engineer all Traffic Engineering and Transportation Planning work, including Expert Witness work. He is a registered Traffic Engineer in the State of California. He has been a leader in traffic engineering and transportation planning for over 34 years. He recently spent 2.5 years doing high-level transportation and traffic engineering in the heart of mainland China, and as a result of this experience, has a very broad view of multimodal transportation. He personally daily utilized China's public transit, buses, monorail, taxis, bikes, electric scooters, and walking and never once drove a car. He is anxious to take the positive aspects of the perspective he learned there, and apply it where appropriate in the United States.

Total Experience

34 Years

Professional Registration

Licensed Traffic Engineer
in the State of California
TR #1453

Grant has much experience in traffic engineering and transportation planning services including ►multi-modal corridor studies, ►intersection alternatives studies, ►traffic operations analysis and ►micro-simulation. He has extensive experience in ►travel demand modeling, ►report writing, ►transportation master plans, ►public presentations, was ►Chief Site Engineer over 70 km of China's bullet train construction near Beijing supervising work over hundreds of engineers and construction workers, ►capital improvement programs and ►traffic mitigation fees to name a few.

Expert Witness Experience, Traffic Engineer

Expert Witness cases included general examination of all roadway conditions and MUTCD compliance, etc. Recent cases involved signal malfunction and broadside fatality, railroad crossing where ped was killed, signalized intersection accident with semi-truck, crosswalk at uncontrolled intersection with severe ped injury, high school pedestrian accident in marked school crosswalk, freeway interchange complex intersection and signal w/crosswalk ped was hit and

Education

California State University, Sacramento
BS Civil Engineering
1984

Professional Affiliations

American Public Works Association (APWA)
Institute of Transportation Engineers (ITE)

killed, absence of guardrail and motorist run off road accident, non-standard intersection layout w/bike and vehicle collisions, closely spaced signalized intersections and adjacent freeway ramps intersection pedestrian in ROW killed by large semi-truck.

- EW 001-100 Richmond EW Jones & Randall
- EW 001-101 Richmond EW Ms Norma Supapo
- EW 001-102 Richmond EW Sakura Sims vs City
- EW 001-103 Richmond EW Melida DIaz RailRoad PED accident
- EW 002-101 San Rafael EW Ketron vs City
- EW 002-102 San Rafael EW Zaslavski vs City
- EW 003-100 PITTSBURG EW Sandoval vs City
- EW 006-101 Marin County EW Rosenthal v. Johnson, et al., Bike / vehicle accident @ Four Corners intersection
- EW 006-102 Marin County EW Goralka Speed and Stopping sight distance on Panoramic Highway
- EW 008-100 MANTECA EW Roundabout Motorcycle fatal accident
- EW 008-200 MANTECA School pedestrian accident in marked crosswalk
- EW 013-100 EMERYVILLE Abad vs City fatal pedestrian accident in crosswalk, truck involved
- EW 014-100 MODESTO Bernal vs Mendez, City, County, Caltrans
- EW 015-100 UTAH DOT, Harriman, UT
- EW 016-100 Oakley, CA, Vancil vs City
- EW 017-100 United States DOJ, Washington State

Traffic Engineering Experience

- ***PRISM Engineering On-Call Services contract with Marin County Public Works:*** 1) Panoramic Highway intersection design study and report, 2) sight distance analyses and report, level of service analysis. (2017-2019)
- ***US 101/SR 131 Interchange in Marin County***. Traffic Operations Study and Micro simulation, working with Bob Goralka of Marin County DPW. Was Project Engineer / Manager (2016)
- ***Radar Speed Surveys in City of Shasta Lake***, 52 locations. Project Engineer/Manager (2015/16)

- ***Chico SR 99/Eaton Rd Interchange Traffic Operations Study*** with NW Specific Plan Analysis (2015/16). Signal Installations, timing study. Realignment of Frontage Road. Micro-Simulation Analysis
- ***City of Vallejo, Charter School Traffic Impact Study***, Project Engineer/Manager. Developed custom trip generation, custom GIS trip distribution, innovative mitigations and Transportation Demand Management (TDM) (2015/16)
- ***LongHuXiYuan, Chongqing, China*** Multi-modal Trip Generation Survey (1900 DU) for (2014)
- ***Chongqing, China Parking Study*** YueLai Conference Center Parking Study (2014)
- ***Signal Design in Chongqing China,*** Five (5) intersections Signal Design, Chongqing, CN (2013)
- ***On-Call Traffic Engineering, Nevada County Transportation Commission*** (2001-2012)

Transportation Planning Experience

- ***PRISM Engineering On-Call Traffic Engineering Services Contract with City of Vacaville Public Works***: "The Farm at Alamo Creek" Residential Annexation (780 DU), Project Engineer. Used Cube traffic model to develop future traffic, traffic impact study, freeway and intersection analyses using Synchro 9 HCM 2010. Traffic report. (2017/18)
- ***City of Fairfield Travis AFB residential development***. Trip generation and HCM 2010 capacity analysis using Synchro 9. Traffic report. (2017)
- ***Marin County Planning Dept., Alta Way Residential Development***, HCM 2010 analysis with Synchro 9 and Traffic Report including sight distance analysis.
- ***City of Vallejo, Charter School*** (1400 stu) Traffic Impact Study, Project Engineer/Manager. Developed custom trip generation, custom GIS trip distribution, innovative intersection and street calming mitigations and Transportation Demand Management (TDM) (2015/16)
- ***Chongqing China YueLai Newtown*** VISSUM Traffic Model Development, ChongQing, CN (2013/14)
- ***Vacaville, CA Quinn Crossing Apartments TIS***, (2012)
- ***Vacaville, CA 4200 DU and School Annexation Study*** of Leisure Town East, (2011)
- ***Vacaville, CA Leisure Town Bypass***, Traffic Model Alternatives, (2010)
- ***City of Los Banos, CA Citywide TRANSCAD Model Development***, 600 zones, (2007)
- ***City of Los Banos, CA Transportation Master Plan***, (2007-08)

- ***On-Call Transportation Planning, Nevada County Transportation Commission*** Numerous planning studies, RTP assistance, (2001-2012 continuously)
- ***TRANSCAD Model Services, Nevada County Transportation Commission*** (2001-2012 cont.)

Project Management

- ***Chief Site Engineer in Liaoning Province in China over Engineering Design and Construction Inspection*** / Stop Order authority for 70 km of China's bullet train construction of tunnels, bridges, viaduct, foundations, piers, towers, and stations. Oversaw manufacturing of concrete, rebar, and quality control. Held regular meetings with Chinese government officials over the train construction. Worked with Chinese engineers in an all-Mandarin environment.

Transit Planning in China, Major Projects

- Grant Johnson designed in AutoCAD layers: 1) Bus Transit Routes & Stations Plan, 2) Bike Trails and Striping Plan, 3) Complete Streets and Traffic Calming Striping and Pavement Markings, 4) Crosswalk and all On street Parking and Traffic Control, YueLai Newtown, Chongqing, CN (2014)
- Transit Hub with Subway Monorail Access by escalator, Taxi Lanes, Bus Stop Lanes, Ped Bridges, Bike Lanes and Roundabout Circling Transit Hub, YueLai Newtown, Chongqing, CN (2014)

Roundabouts

- ***Caltrans SR 49 / Pleasant Valley Road at Faith Lane***, Stonehenge Springs Traffic Impact Study and analysis, report (2017)
- ***Roundabout Study I-80 Lewis Road and Weber Road interchanges***, Solano County, CA (2012)
- ***SR 49 Freeway Ramps and Main Street*** intersection Roundabout, Grass Valley, CA (2002)

EDUCATION. PROFESSIONAL LICENSES

Grant P. Johnson, TE
Principal
PRISM Engineering
PROJECT MANAGER and ENGINEER

Currently Registered as a Traffic Engineer in the State of California
TR #1453

Received BS in Civil Engineering from California State University, Sacramento in 1984


The Trustees of
THE CALIFORNIA STATE UNIVERSITY
On recommendation of the faculty of the
SCHOOL OF ENGINEERING AND COMPUTER SCIENCE
CALIFORNIA STATE UNIVERSITY, SACRAMENTO
have conferred upon
GRANT PHILLIP JOHNSON
in recognition of the fulfillment of the requirements, the degree of
BACHELOR OF SCIENCE IN CIVIL ENGINEERING
with all the rights, privileges, and honors thereto pertaining
Given at Sacramento this thirty-first day of May, nineteen hundred eighty-four

WEB PRESENCE: WWW.PRISM.ENGINEERING

PRISM Engineering

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