CITY OF VENTURA

# CITY COUNCIL AGENDA

# Supplemental Information Packet

## Public Communications and Agenda Related Items Received by 3:00 p.m., May 18, 2020.

## Meeting of May 18, 2020

**Supplemental Information:**

Any agenda related public documents received and distributed to a majority of the City Council after the Agenda Packet is printed are included in Supplemental Packets. Supplemental Packets are produced as needed. The Supplemental Packet is available in the City Clerk's Office, 501 Poli Street, Room 204, Ventura, during normal business hours as well as on the City's Website – www.cityofventura.ca.gov https://www.cityofventura.ca.gov/1236/City-Council-Public-Hearing-NoticesSuppl

# 8H. Second Extension - Redflex Traffic Systems Agreement

8H

**Antoinette Mann.**

**From:** Jay Beeber <[redacted]>
**Sent:** Monday, May 18, 2020 8:33 AM
**To:** City Clerk
**Subject:** -EXT- Fwd: Important Information for Today's Council Meeting – Item 8H
**Attachments:** Updated Comments on Ventura Red Light Camera Program.pdf

**Follow Up Flag:** Flag for follow up
**Flag Status:** Flagged

17 pages

FYI

-------- Forwarded Message --------
**Subject:**Important Information for Today's Council Meeting – Item 8H
**Date:**Mon, 18 May 2020 08:29:09 -0700
**From:**Jay Beeber <[redacted]>
**To:**mlavere@cityofventura.ca.gov

Dear Mayor LaVere,

I hope this email finds you well.

I am contacting you regarding Agenda Item 8H on today's council agenda: Second Extension - Redflex Traffic Systems Agreement

Safer Streets L.A. is a research organization dedicated to the adoption of scientifically sound and sensible transportation and traffic laws. We conducted an analysis of the red light camera program in Ventura and provide the attached report for your consideration. Our goal in forwarding you this information is to share with you additional data on the use of photo enforcement in Ventura which is not provided in the staff report on this item. We hope that this information proves useful in your deliberations as to whether or not to continue the red light camera program in Ventura.

The Executive Summary from our report follows. We hope you will review the entire report which is attached to this email. If you have any follow-up questions, please do not hesitate to contact us.

**EXECUTIVE SUMMARY**

Safer Streets L.A. conducted an analysis of the red light camera program in Ventura, CA. Our findings are as follows:

1. Contrary to claims made in the staff report, the use of red light cameras does not appear to have positively influenced driving behavior in the City of Ventura. Data provided by the city shows no reduction in red light related collisions over a 13 year period. In addition, there has been a steady increase in red light violations captured by the system over the past eight years. This further undermines the claim that the red light cameras have had a positive effect on driver behavior.

2. Left-turn ticketing has increased over 500% over the past 6 years. This increase has occurred primarily at four intersection approaches where the increase was sudden and dramatic. Staff should be instructed to investigate and report back on the cause of this increase.

3. As a result of this increase, over 65% of tickets are now issued for left turn violations at intersections where the yellow time is likely insufficient for the safe and legal movement of traffic. The new Recommended Practice recently published by the Institute of Transportation Engineers would require an increase in the current yellow signal timing. This increase would likely eliminate the vast majority of left turn violations.

4. The current contract does not fully protect the city should the new ITE Recommended Practice be incorporated into the CA-MUTCD. If extended, the contract should be amended to ensure that the city can either cancel for convenience or if changes to the CA-MUTCD result in the program operating at a loss.

5. The city issues about 15% of automated tickets for slow rolling-right-turns. These tickets carry a $490 fine and are a huge financial burden on citizens for a relatively minor infraction. City officials may wish to consider amending the citation policy with regards to rolling-right-turns to either only cite for this violation when conducted in such a manner as to present a clear and present danger to other roadway users, or to issue warning notices for a first-time offense.

The full report is attached.

Sincerely,

Jay Beeber
Executive Director
Safer Streets L.A.
818-205-4790

cc:
Sofia Rubalcava, Deputy Mayor
Lorrie Brown, Councilmember
Jim Friedman, Councilmember
Cheryl Heitmann, Councilmember
Erik Nasarenko, Councilmember
Christy Weir, Councilmember

# Updated Comments on Ventura Red Light Camera Program

**By Jay Beeber, Safer Streets L.A., Member ITE**

## EXECUTIVE SUMMARY

Safer Streets L.A. conducted an analysis of the red light camera program in Ventura, CA. Our findings are as follows:

1. Contrary to claims made in the staff report, the use of red light cameras does not appear to have positively influenced driving behavior in the City of Ventura. Data provided by the city shows no reduction in red light related collisions over a 13 year period. In addition, there has been a steady increase in red light violations captured by the system over the past eight years. This further undermines the claim that the red light cameras have had a positive effect on driver behavior.

2. Left-turn ticketing has increased over 500% over the past 6 years. This increase has occurred primarily at four intersection approaches where the increase was sudden and dramatic. Staff should be instructed to investigate and report back on the cause of this increase.

3. As a result of this increase, over 65% of tickets are now issued for left turn violations at intersections where the yellow time is likely insufficient for the safe and legal movement of traffic. The new Recommended Practice recently published by the Institute of Transportation Engineers would require an increase in the current yellow signal timing. This increase would likely eliminate the vast majority of left turn violations.

4. The current contract does not fully protect the city should the new ITE Recommended Practice be incorporated into the CA-MUTCD. If extended, the contract should be amended to ensure that the city can either cancel for convenience or if changes to the CA-MUTCD result in the program operating at a loss.

5. The city issues about 15% of automated tickets for slow rolling-right-turns. These tickets carry a $490 fine and are a huge financial burden on citizens for a relatively minor infraction. City officials may wish to consider amending the citation policy with regards to rolling-right-turns to either only cite for this violation when conducted in such a manner as to present a clear and present danger to other roadway users, or to issue warning notices for a first-time offense.

## BACKGROUND

Safer Streets L.A. is a grassroots organization dedicated to the adoption of scientifically sound and sensible transportation and traffic laws. We believe that accurate information and critical thinking are crucial to implementing sound public policy. Towards that end, we strive to provide the public and elected representatives with well researched and verifiable data. Our goal is to promote science based solutions to motorist and pedestrian safety issues. Safer Streets L.A. provides this information on a voluntary basis and is not paid to interact with elected officials.

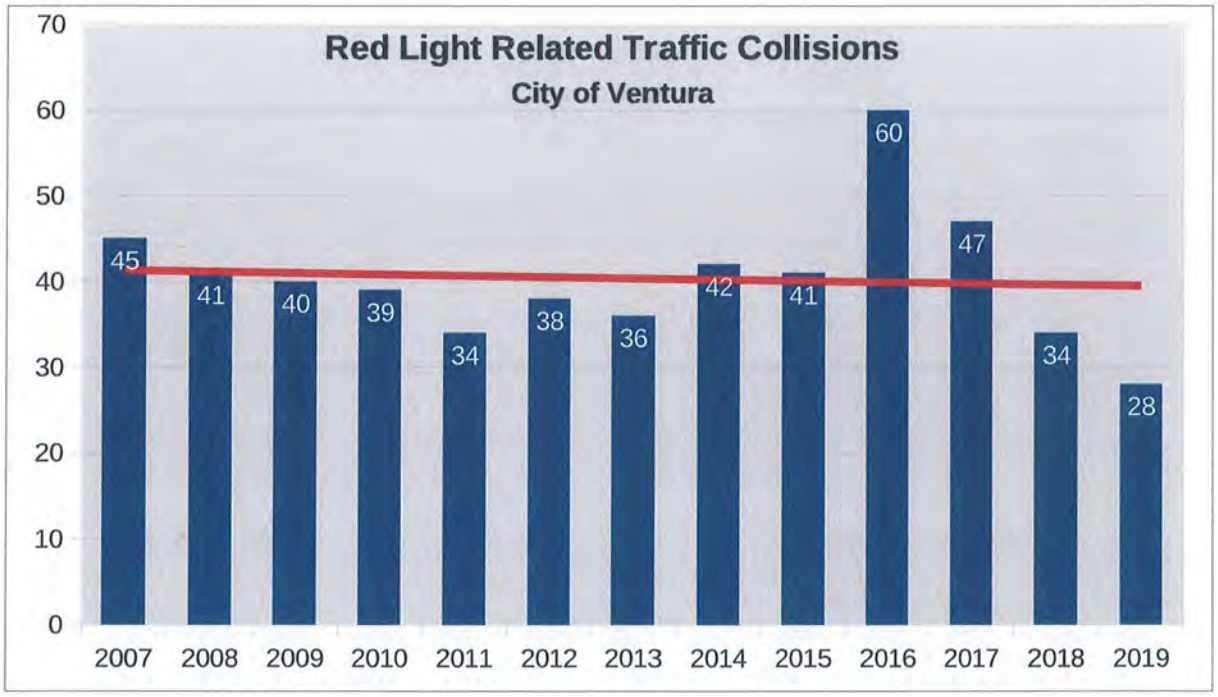
Our goal in forwarding you the following information is to share additional data on the use of photo enforcement in the City of Ventura which is not provided in the staff report on this item. We hope that this information proves useful in your deliberations as to whether or not to continue the red light camera program in Ventura.

## SAFETY ANALYSIS

### Collision History

The current staff report claims that, *"Photo enforcement continues to influence driving behavior positively, and awareness, as it relates explicitly to red light violations throughout the City, not just at the camera, enforced intersections".*

However, the report fails to provide any comparative collision data to corroborate this claim. Using data provided by the city, the chart below shows the annual number of red light running collisions in Ventura from 2007 through 2019.




Although the number of collisions fluctuates from year to year as expected, the data clearly shows that there is no downward trend (red trend line) in collisions due to red light camera enforcement over the 13 year period. It is difficult to assess, therefore, how the staff report could claim that the red light cameras continue to positively influence driving behavior when there has been no statistically significant change in red light related collisions for more than a decade.

Note that the time period chosen for this analysis begins in 2007, the first year subsequent to a change in the way the Ventura Police Department reports collisions. This change in collision reporting procedures was disclosed during a City Council meeting in 2015 in response to a question posed by then-mayor Heitmann. The following answer was provided by staff:

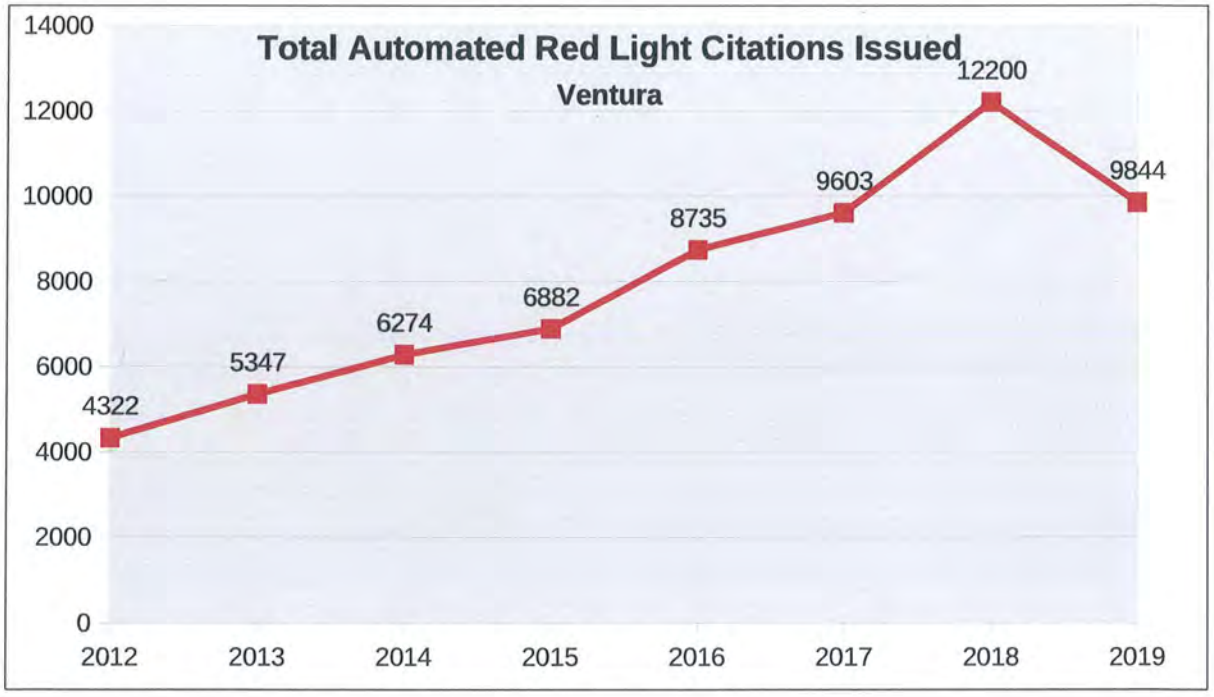
*"The way the police department reports collisions now is vastly different than we did when we started this program. Now we only report - correct me if I'm wrong - now we only report injury or major property damage collisions. That's different. Our total collision numbers are down quite a bit because the reporting is different."*

This change makes it impossible to compare collision data from years prior to 2007. Therefore, any

claims of a reduction in collisions due to automated enforcement compared to years prior to 2007 cannot be substantiated.

## Violation/Citation Data

Further undermining the claim that the red light cameras have had a positive effect on driver behavior is the steady increase in red light violations captured by the system over the past eight years. The chart below shows the significant upward trend in citations issued at all red light camera locations in the city. Clearly, the presence of the cameras is not decreasing the number of violations.

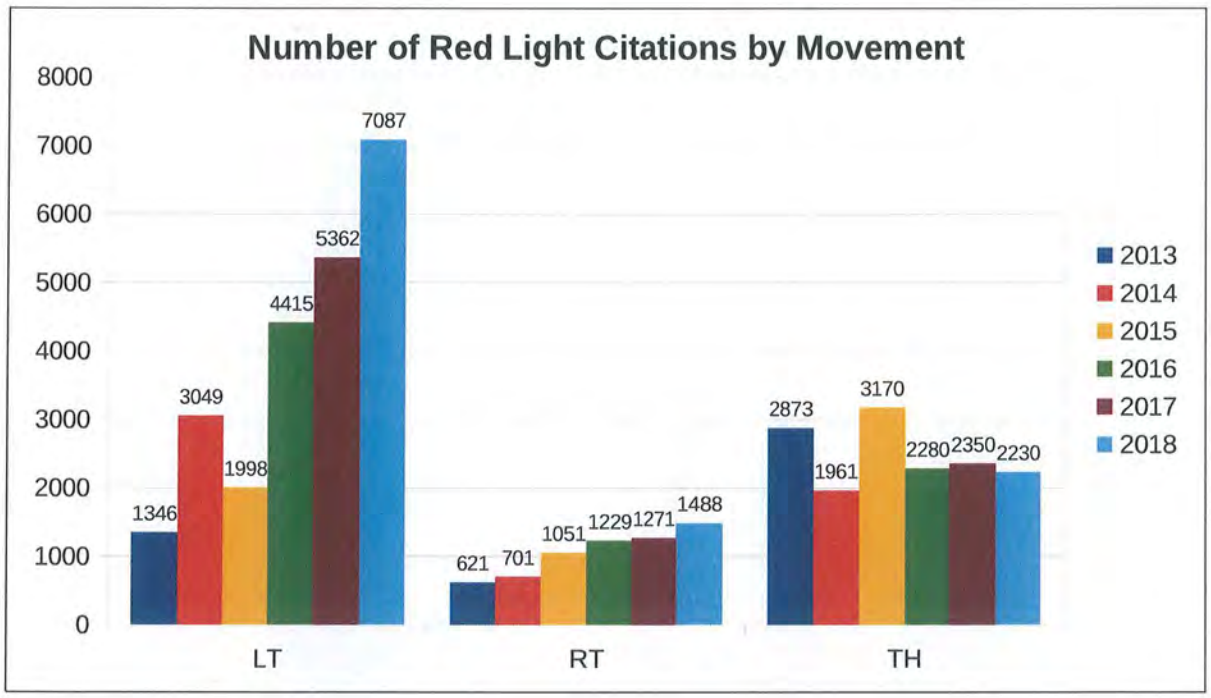


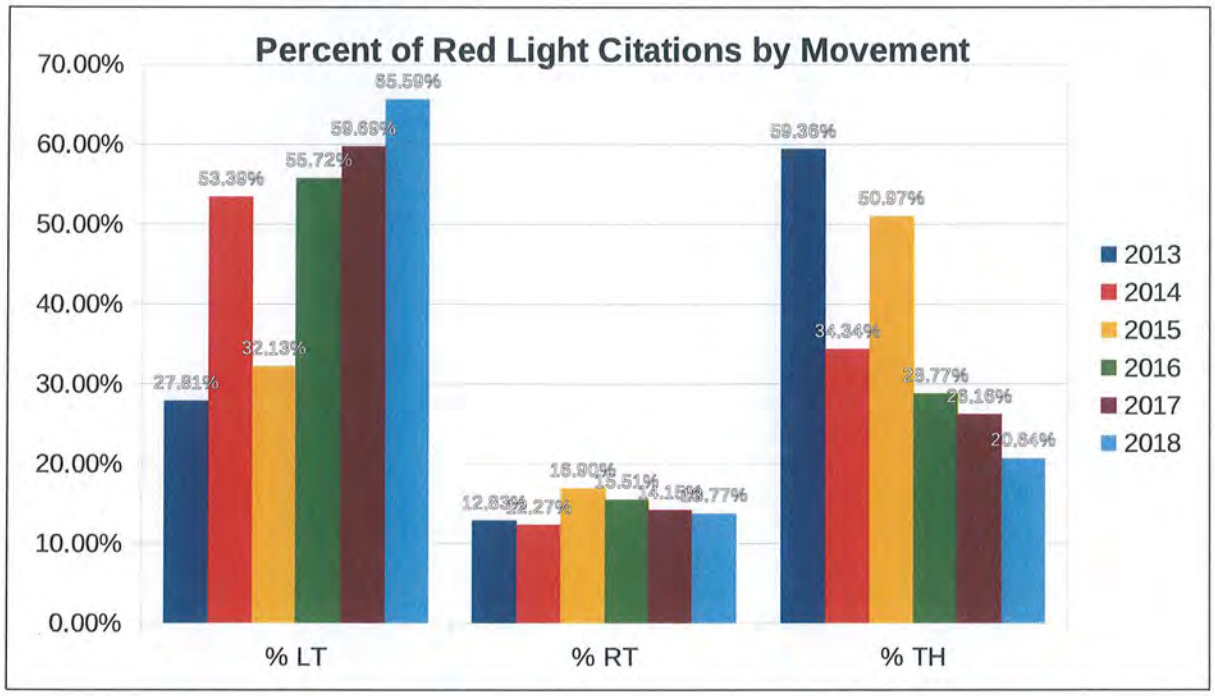

Note that in 2019, some of the red light camera locations were non-operational for a number of months which resulted in a decrease in the total number of citations issued. Had these outages not occurred, the citation rate for 2019 would have matched or exceeded the previous year's total.

# CITATION ANALYSIS

## Citation Profile

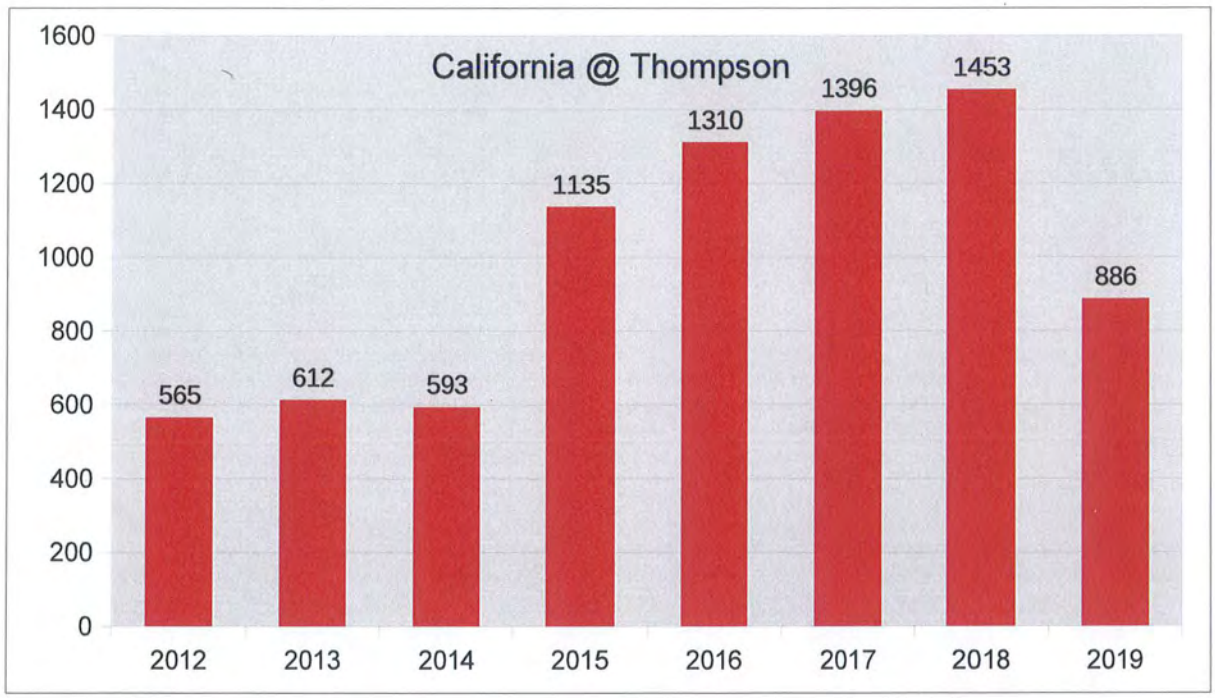
Three types of vehicular movements are monitored by the cameras - through movements, left turns, and right turns. Each of these movements represents a different type of red light running violation, each carrying a relatively different safety risk to other roadway users. The charts below show the number and relative percentage of each type of movement by year.

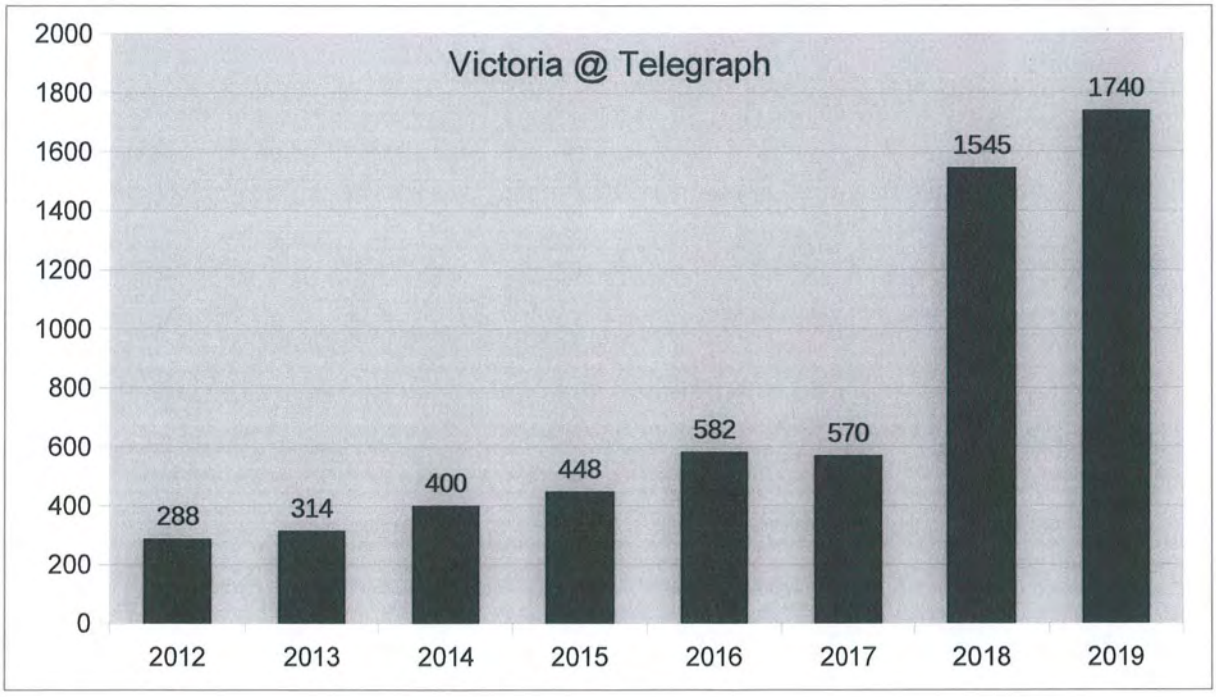


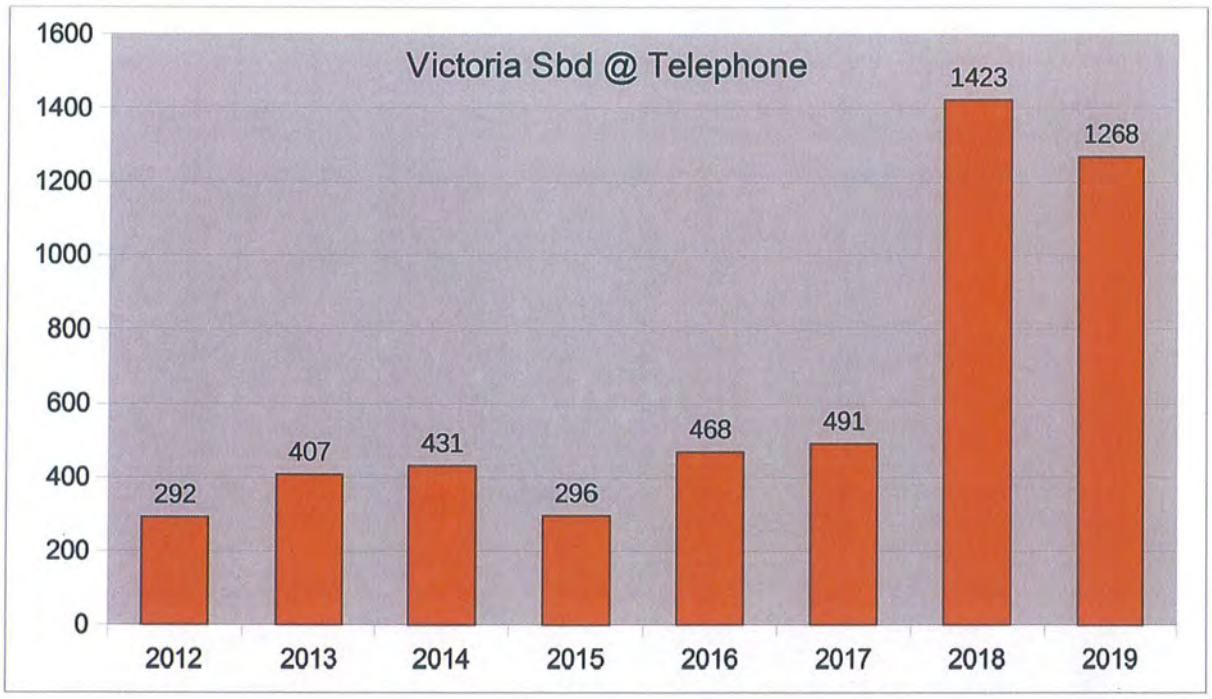



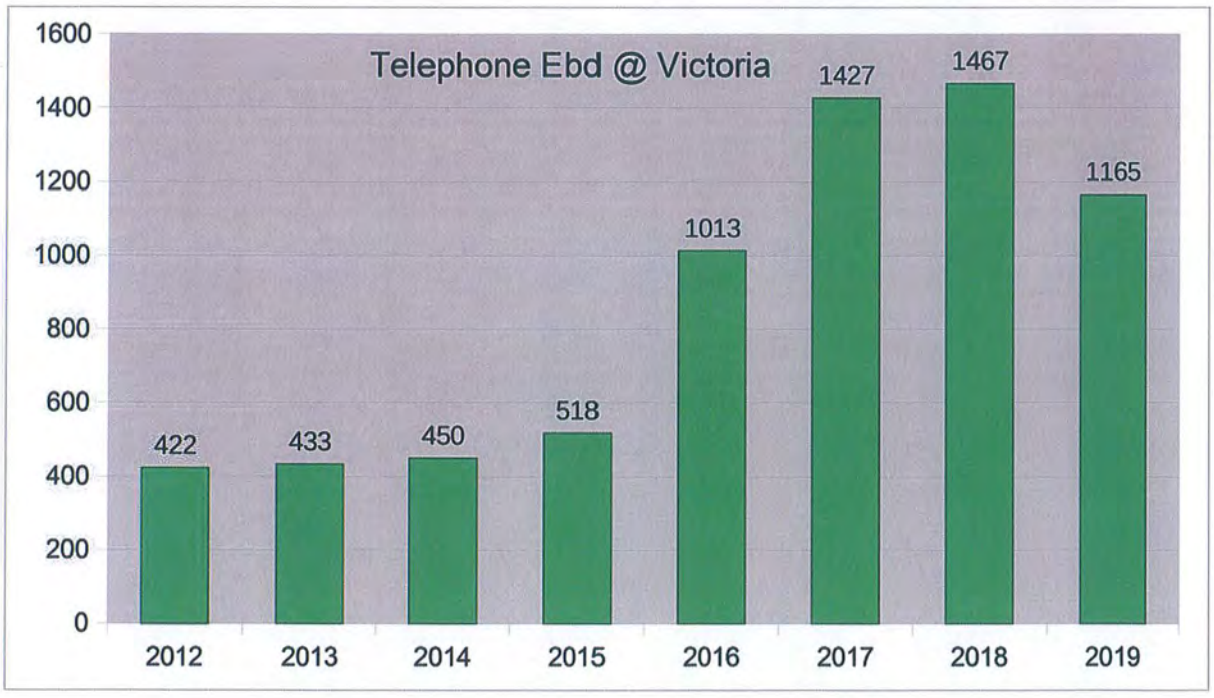

Note that since 2013, the first year this data became available, the number of left turn violations has increased over five-fold. During the same period, the number of right turn violations has more than doubled, while the number of through movement violations has remained relatively steady. As a result, left turn violations have become the dominant violation for which a red light camera citation is issued, representing over 65% of automated tickets issued in Ventura.

This left turn violation increase has occurred primarily at four intersection approaches: California at Thompson, Victoria at Telegraph, Victoria Sbd at Telephone, and Telephone Ebd at Victoria.


California @ Thompson
1600
1400
1200
1000
800
600
400
200
0
565
612
593
1135
1310
1396
1453
886
2012
2013
2014
2015
2016
2017
2018
2019


Victoria @ Telegraph
2000
1800
1600
1400
1200
1000
800
600
400
200
0
288
314
400
448
582
570
1545
1740
2012
2013
2014
2015
2016
2017
2018
2019




Note that the increases represent an abrupt change which cannot be due to changes in traffic volume or driver behavior. Such changes in the left turn violation rate are generally caused by one of the following factors; 1) a change in either the yellow interval or maximum green time, 2) a change in the configuration or other engineering at the location, or 3) a change to the operation of the camera system such as the threshold speed at which the camera triggers a violation or addition of enforcement of lanes not previously enforced.

The significant number of violations occurring at these intersection approaches is uncommon and should be investigated to determine the cause. Likely, there is an engineering issue that needs to be addressed, such as an insufficient yellow interval.

## Yellow Change Interval Timing

While we have been unable to confirm the current yellow interval timing at the photo enforced intersections in Ventura, it is almost a certainty that the timing for the left turn movements is insufficient for the safe and legal movement of vehicles, especially at the four intersection approaches discussed above.

Note that we are not suggesting that the timing does not comply with the minimum 3.0 second standard defined in the California Manual on Uniform Traffic Control Devices (CA-MUTCD). Rather, we are relating that this standard is no longer considered a "best practice", especially with regards to yellow signal timing for turning lanes. Even if the city employs a longer yellow time than legally required, the yellow signal timing for these photo enforced turning lanes is likely significantly deficient. Yellow signal timing for turning lanes has never been based on proper engineering principles and the CA-MUTCD only requires a minimum of 3.0 seconds regardless of the approaching traffic's speed or length and number of turning lanes.

However, in March 2020, the Institute of Transportation Engineers (ITE) published a new Recommended Practice on yellow change interval timing. Jay Beeber of Safer Streets L.A. played a significant role in creating the updated guidelines, especially for yellow times in turning lanes. Within the Recommended Practice, ITE has adopted a new formula for setting yellow signal times that was created and promoted by our team. Mr. Beeber also authored an article explaining the use of this new formula which appeared in the March 2020 issue of the ITE Journal. The article, which might prove instructive for city staff, is included at the end of this report.

Since the Recommended Practice was released just two months ago, the CA-MUTCD and state law have not yet been updated. However, once this update occurs, yellow signal times in turning lanes will likely need to be increased. Revising the yellow times per the ITE Recommended Practice will likely eliminate the vast majority of left turn violations occurring at these intersections. This will have a positive effect on safety, as we have consistently seen a significant reduction in red light running when yellow times have been increased to more appropriate levels. However, with lower violations, the city will likely see a decrease in the revenue generated by the red light cameras and could end up operating the program with a deficit, especially since over 65% of the ticket revenue comes from left turn violations.

For this reason, we strongly suggest that the city not extend the Redflex contract under the current terms. While the contract does provide for cancellation if there is a change in state law, it does not extend this provision for changes to regulations such as those appearing in the CA-MUTCD. It is possible that the standards for yellow light timing could change within the CA-MUTCD without requiring any change to state law. Based on the current contract language, Redflex may not consider a change to the CA-MUTCD as a valid reason for canceling or renegotiating the contract. Note also that many cities with long-term contracts have negotiated the option to cancel for convenience with 30 days notice. The City of Hawthorne has obtained such a provision from Redflex. The City of Ventura should not renew a contract which provides less favorable terms than other nearby cities.

## A $490 Citation

As noted above, ticketing for "rolling-right-turns" has more than doubled over the past six years. While theses types of violations are "easy pickins" for enforcement, they generally pose little to no

safety hazard unless the turn is made at a high rate of speed (which is rare). Our analysis in Los Angeles found that the chance that a rolling right turn might result in a collision was approximately 1 in 345,000. Additional data from the FHWA supports the extremely low crash and injury danger posed by rolling-right-turns. Although these violations are technically considered equivalent to straight-through violations with regards to the fines and penalties imposed, carrying a $490 penalty and the potential for a license point, they are not equivalent in terms of the danger posed to other roadway users. It is highly unlikely that when the Ventura City Council approved the use of ticketing cameras, they intended that the program would be issuing such a significant number of $490 tickets for this minor violation. Yet this is the reality of the city's program as it exists today.

Rolling-right-turn tickets are a huge financial burden on citizens for a relatively minor infraction and engender unnecessary animosity and disrespect for elected officials and law enforcement. While the city does not set the fine amount, the city does choose which types of violations to enforce. If the red light camera program is extended, city officials may wish to consider amending the citation policy with regards to rolling-right-turns.

Many cities do not choose to cite for rolling-right-turns, or if they do, they only issue these tickets when the video shows that the maneuver was conducted in an extremely unsafe manner and posed a direct danger to other roadway users. Alternatively, providing a warning to violators prior to issuing a citation for a second violation can be an effective safety measure. Issuing a warning notice for a first time slow rolling-right-turn would provide the possibility of an effective deterrence to repeated violations while ensuring that the $490 tickets do not become a financial burden on citizens who make an unintentional or infrequent mistake. This is especially important considering the disaster to our economy brought on by the pandemic, which has most impacted the lowest income stakeholders.

## Additional Measures for Reducing Red Light Running

Any staff report on automated enforcement should include a discussion of other measures that can be used to reduce red light running. Table 1 from FHWA's "*Engineering Countermeasures to Reduce Red-Light Running*" provides a small sample:

**Table 1: Summary of Engineering Countermeasures to Reduce Red-Light Running**

| Improve Signal Visibility/ Conspicuity | Increase the Likelihood for Stopping | Remove Reasons for Intentional Violations | Eliminate the Need to Stop |
|---|---|---|---|
| Signal for Each Approach Through Lane | Install Signal Ahead Signs | Adjust Yellow Change Interval | Coordinate Signal Operation |
| Install Backplates | Install Transverse Rumble Strips | Provide or Adjust All-Red Clearance Interval | Remove Unwarranted Signals |
| Modify Placement of Signal Heads | Install Activated Advance Warning Flashers | Adjust Signal Cycle Length | Construct a Roundabout |
| Increase Size of Signal Displays | Improve Pavement Surface Condition | Provide Dilemma Zone Protection | |
| Install Programmable Signal/ Visors or Louvers | | | |
| Install LED Signal Lenses | | | |

It is always good engineering practice to periodically review signalized intersections to ensure that all necessary engineering countermeasures are in place. The benefit to employing engineering countermeasures such as increasing yellow intervals or improving signal conspicuity, is that these are

long term solutions, in most cases with a low one-time cost. Automated enforcement is an ongoing expense to the city which does not appear to have achieved its objectives. While enforcement of traffic laws is a necessary component of any good traffic safety program, engineering countermeasures should be employed first and enforcement used to deal with the behavior of the relatively small numbers of residual outliers.

## CONCLUSIONS

A review of the collision and violation data strongly suggests that the use of red light cameras, while well intentioned, has not reduced red light running collisions or violations.

Further, left-turn ticketing has increased over 500% over the past 6 years. This has occurred primarily at four intersection approaches where the increase was sudden and dramatic. Staff should be instructed to investigate and report back on the cause of this increase.

As a result of this increase, over 65% of tickets are now issued for left turn violations at intersections where the yellow time is likely insufficient for the safe and legal movement of traffic. The new Recommended Practice recently published by the Institute of Transportation Engineers would require an increase in the current yellow signal timing. This increase would likely eliminate the vast majority of left turn violations.

Although only about 15% of the tickets are issued for slow rolling-right-turns, these tickets carry a $490 fine and, potentially, an added driver's license point. They are a huge financial burden on citizens for a relatively minor infraction and engender unnecessary animosity and disrespect for elected officials and law enforcement. City officials may wish to consider amending the citation policy with regards to rolling-right-turns to either only cite for this violation when conducted in such a manner as to present a clear and present danger to other roadway users, or to issue warning notices for a first-time offense.

The current contract does not fully protect the city in the case of a change to the CA-MUTCD but not state law. If extended, the contract should be amended to ensure that the city can either cancel for convenience or if changes to the CA-MUTCD result in the program operating at a loss.

For more information, please contact:

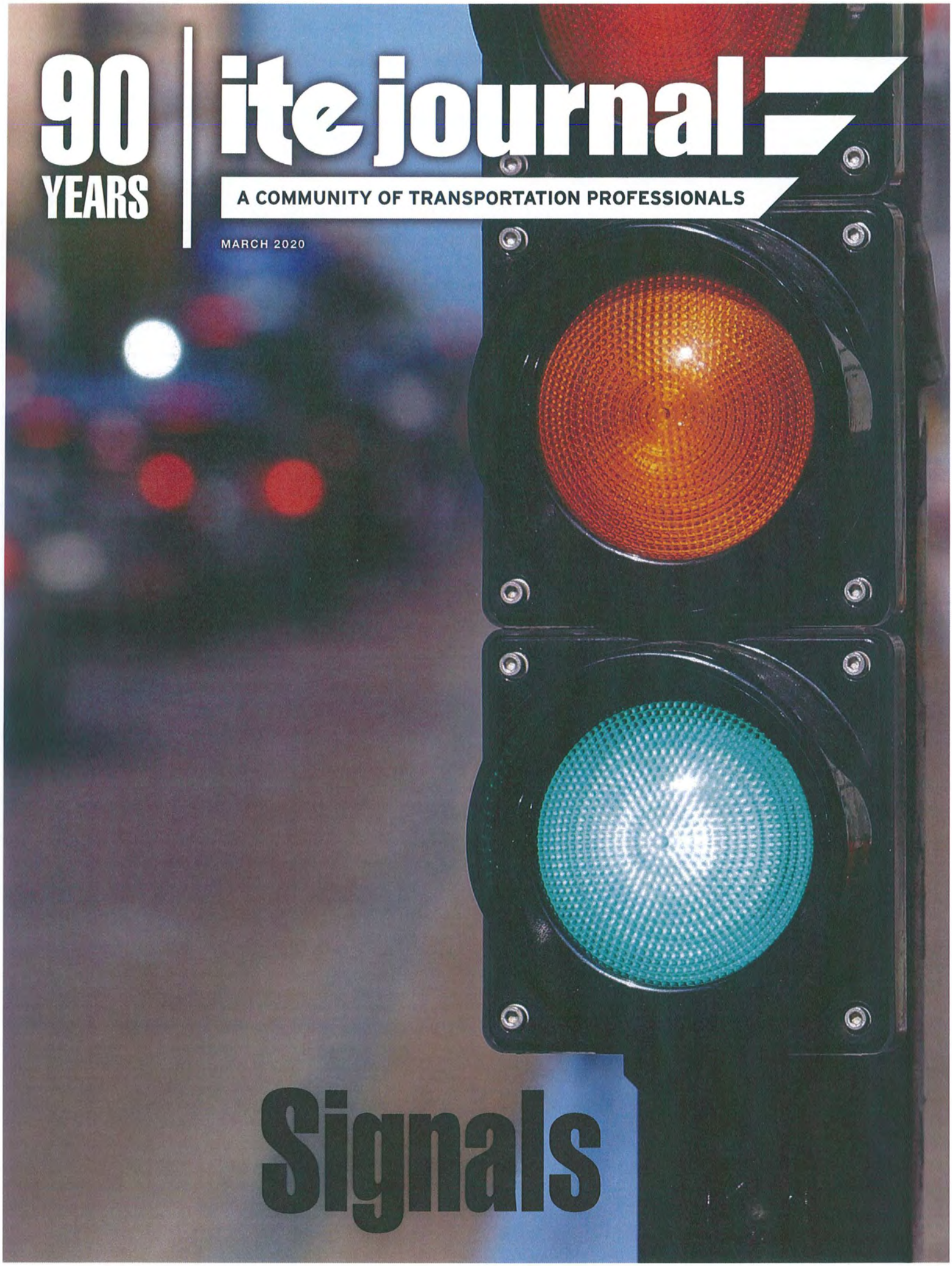
Jay Beeber
Executive Director, Safer Streets L.A.
Member - ITE
818-205-4790

90 YEARS

ite journal

A COMMUNITY OF TRANSPORTATION PROFESSIONALS

MARCH 2020



# Signals

TOOL

SHUTTERSTOCK/JPREAT

# An Explanation of Mats Järlström's Extended Kinematic Equation

BY JAY BEEBER (M)

Since the yellow indication was first added to traffic signals in 1920, the proper interval duration has been robustly debated.[1] Seemingly, the timing of the yellow indication appears straightforward. However, determining the illumination interval is quite intricate since it is part of a complex system of physical and human-made laws, technology, and human behavior that all must operate compatibly.

In 1960, Denos Gazis, Robert Herman, and Alexei A. Maradudin (GHM) provided a scientific solution to the yellow change interval question in their paper, "The Problem of the Amber Signal Light in Traffic Flow."[2] GHM presented a kinematic solution to a binary STOP or GO dilemma when a driver is faced with the onset of a yellow signal indication. The problem GHM solved and eliminated was an area in the roadway known as the "dilemma zone", where a driver-vehicle complex could neither STOP safely and comfortably nor GO without the need to violate the red or accelerate unsafely into the intersection.

GHM's solution to regulate a yellow change interval first appeared in the 1965 ITE *Traffic Engineering Handbook*, and it has become known as the kinematic equation.[3] However, GHM's solution is limited to vehicles traveling through level intersections at constant velocity, which does not include vehicle deceleration to execute safe turning maneuvers. This article presents a brief review covering GHM's original solution and Mats Järlström's extended kinematic equation which allows for vehicle deceleration and turning maneuvers.[4]

## GHM's Solution

The foundation of GHM's solution is a minimum safe and comfortable DISTANCE to STOP, defined as the "critical distance" ($x_C$), which is composed of an allocated perception-reaction distance ($x_{PR}$) plus a minimum braking distance ($x_{Br}$). It is expressed mathematically as:

$$x_C = x_{PR} + x_{Br} = v_0 \bullet t_{PR} + \frac{v_0^2}{2a_{max}} \quad (1)$$

Where:

$x_C$= Critical distance - the minimum safe and comfortable stopping distance, (feet [ft.] or meters [m])

$v_0$= Maximum uniform (constant) initial/approach velocity, (foot per second [ft./s] or meter per second [m/s])

$t_{PR}$= Maximum allocated driver-vehicle perception-reaction time, (s)

$a_{max}$= Maximum uniform (constant) safe and comfortable deceleration, (ft./s² or m/s²)

GHM's GO solution is the minimum TIME needed for a vehicle to travel across the critical distance ($x_C$) and is thus the minimum yellow change interval ($Y_{min}$) required to eliminate the dilemma zone. The solution is calculated by dividing the critical distance by the vehicle's maximum constant velocity across that distance. For driver-vehicles that maintain their initial velocity ($v_0$) across the critical distance, this is expressed mathematically as:

$$Y_{min} = \frac{x_c}{v_0} = \frac{v_0 t_{PR}}{v_0} + \frac{\frac{v_0^2}{2a_{max}}}{v_0} \quad (2)$$

Which reduces to the well-known kinematic equation:

$$Y_{min} = t_{PR} + \frac{v_0}{2a_{max}} \quad (3)$$

Since restrictive yellow laws (drivers must not enter the intersection on yellow) prevailed in their jurisdiction, GHM's original yellow time solution also included the minimum clearance interval ($t_{CI}$) to allow a vehicle with length ($L$) to travel straight through and exit an intersection with a width ($w$), expressed as:

$$t_{CI} = \frac{w + L}{v_0} \quad (4)$$

Internationally, "permissive" yellow change laws (driver-vehicles may enter the intersection during the entire yellow interval) are most common and the clearance interval function is often handled by employing a separate "all-red" interval.

Figure 1 illustrates the above concepts for both restrictive ($Y_R$) and permissive ($Y_P$) yellow timing policies.

This article promotes the most common permissive yellow change interval timing policy, but practitioners should note that where restrictive yellow laws prevail, the yellow interval must also handle the clearing function.

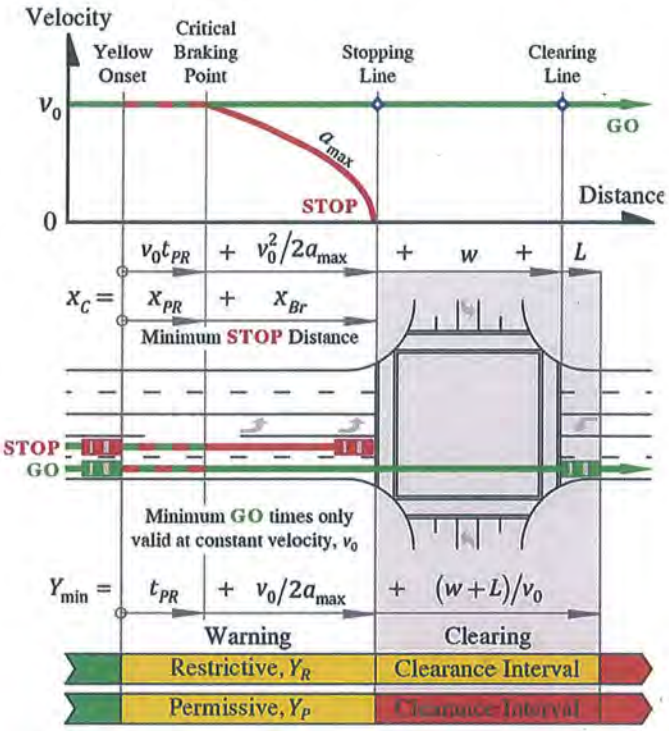



*Figure 1. GHM's minimum STOP and GO equations plotted and referenced to a signalized intersection.*

## Limitations of GHM's Kinematic Equation

An essential concept to be recognized is that GHM's Kinematic Equation can only be derived if both the initial velocity ($v_0$) which is used to calculate the minimum stopping distance and the vehicle's velocity while traversing the minimum stopping distance are the same. Where a vehicle must slow down for any reason, such as to negotiate a turn, the initial velocity ($v_0$) and the vehicle's velocity while traversing the critical distance are NOT the same and GHM's Kinematic Equation cannot be used. This point has been reiterated in correspondence by Dr. Alexei A. Maradudin, the sole surviving author of the original GHM paper:[5]

"This formula which we derived, cannot be applied to turning lanes or to any situation where the driver must decelerate within the critical distance. The formula can only be applied to vehicles which start at the maximum allowable speed measured at the critical stopping distance and which proceed at a constant speed into the intersection."

Järlström has devised a new protocol to extend the kinematic equation for situations where a vehicle must slow down within the minimum stopping distance based on GHM's logic.

## GHM's Logic Extended to Turning Movements

A central axiom of traffic signal timing is that, at the onset of the yellow indication, a "reasonable" driver farther from the intersection than their minimum stopping distance (critical distance) has sufficient distance to stop comfortably and should do so. Likewise,

a "reasonable" driver closer to the intersection than their critical distance proceeds into the intersection when presented with a yellow indication. Figure 2 illustrates this concept.

The logic behind the methodology for determining the duration of the yellow change interval is that the interval should provide a reasonable driver who is too close to the intersection to stop safely and comfortably (i.e., closer than the critical distance) with adequate time to traverse the minimum stopping distance and legally enter the intersection before the signal turns red.

A reasonable driver is defined as one who is not violating the law (i.e., acting legally), and whose chosen actions are rational, prudent, and feasible. Safety and equity requires that the motion of any roadway user who exhibits reasonable behavior must be accommodated within the signal timing protocol, even if their chosen actions are not the "average" or most common to be encountered upon the roadway.

In conformance with the standard for through lane movements, the calculation of the minimum yellow change interval for turning movements must also provide a reasonable driver adequate time to traverse the minimum stopping distance and legally enter the intersection before the onset of the red indication. This calculation must allow for the extra time necessary for a vehicle to traverse

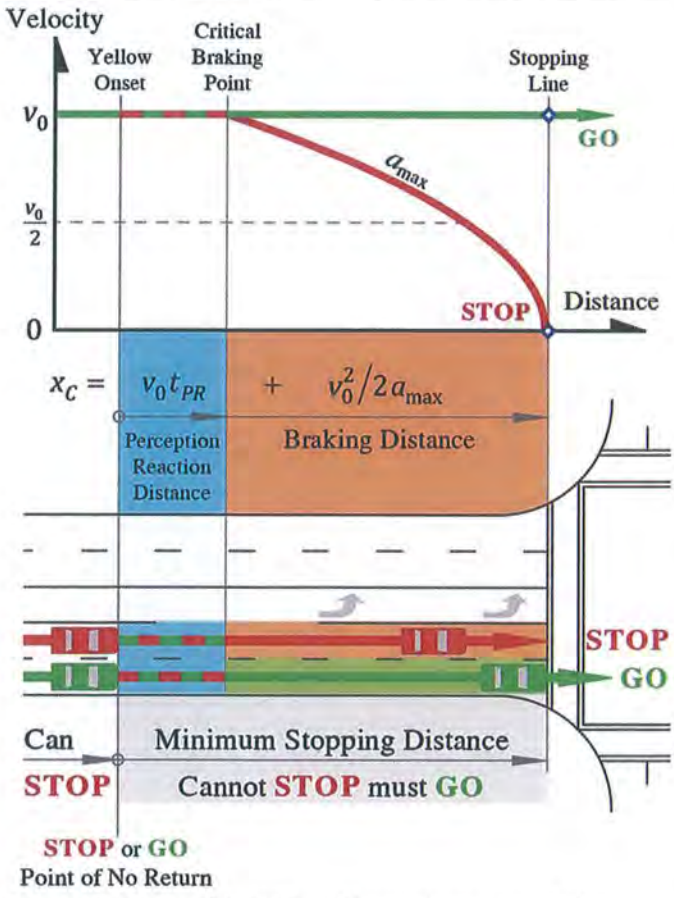



*Figure 2. Illustration of the STOP or GO scenario encountered when approaching a signalized intersection.*

the stopping distance while decelerating from the initial approach velocity ($v_0$) to the intersection entry velocity ($v_E$) to safely and comfortably negotiate a turning maneuver.

In contrast to the condition where a driver approaches a signalized intersection in a through lane, scenarios where a driver approaches a signalized intersection in a turning lane are significantly more complicated. Although there is a range of possibilities as to where a driver might begin to decelerate on approach to the intersection, the extended solution presented in this article is based on a model of driver-vehicle motion which encompasses the "worst-case scenario" or "boundary condition" for a decelerating vehicle. A full explanation of this concept and examination of other models of driver-vehicle motion is presented in "Yellow Change Intervals for Turning Movements Using Basic Kinematic Principles," available on the ITE website at www.ite.org/technical-resources/topics/traffic-engineering/traffic-signal-change-and-clearance-intervals.

## Järlström's Extended Kinematic Equation

For the extended solution, conceive that the driver begins their deceleration at the Critical Braking Point, decelerating at their maximum safe and comfortable deceleration ($a_{max}$) to their target entry velocity ($v_E$) and then traverses the remainder of the braking distance at this velocity into the intersection.

Under this "boundary condition" model for a decelerating vehicle, the minimum stopping distance ($x_C$) is divided into three distinct areas of vehicle movement: 1) the Perception-Reaction zone ($x_{PR}$), 2) a Deceleration Zone ($x_{Dec}$) where the driver decelerates to their target entry velocity ($v_E$) beginning at the Critical Braking Point, and 3) a Non-Deceleration "Go Zone" ($x_{Go}$) starting at the end of the Deceleration Zone where the driver continues at their target entry speed to the limit line and into the intersection. Figure 3 illustrates these concepts.

The minimum time to traverse the minimum stopping distance is, therefore, the combination of 1) the time to traverse the perception-reaction distance ($t_{PR}$), plus 2) the time to traverse the Deceleration Zone ($t_{Dec}$), plus 3) the time to traverse the Go Zone ($t_{Go}$). This combination is the minimum yellow change interval ($Y_{min}$) necessary to eliminate the dilemma zone for this model of driver-vehicle motion, expressed as:

$$Y_{min} = t_{PR} + t_{Dec} + t_{Go} \quad (5)$$

The time to traverse the Deceleration Zone is given by:

$$t_{Dec} = \frac{(v_0 - v_E)}{a_{max}} \quad (6)$$

The time to traverse the Go Zone ($t_{Go}$) is determined as follows:

First, calculate the length of the Go Zone ($x_{Go}$) by subtracting the length of the Deceleration Zone ($x_{Dec}$) from the full braking distance ($x_{Br}$).

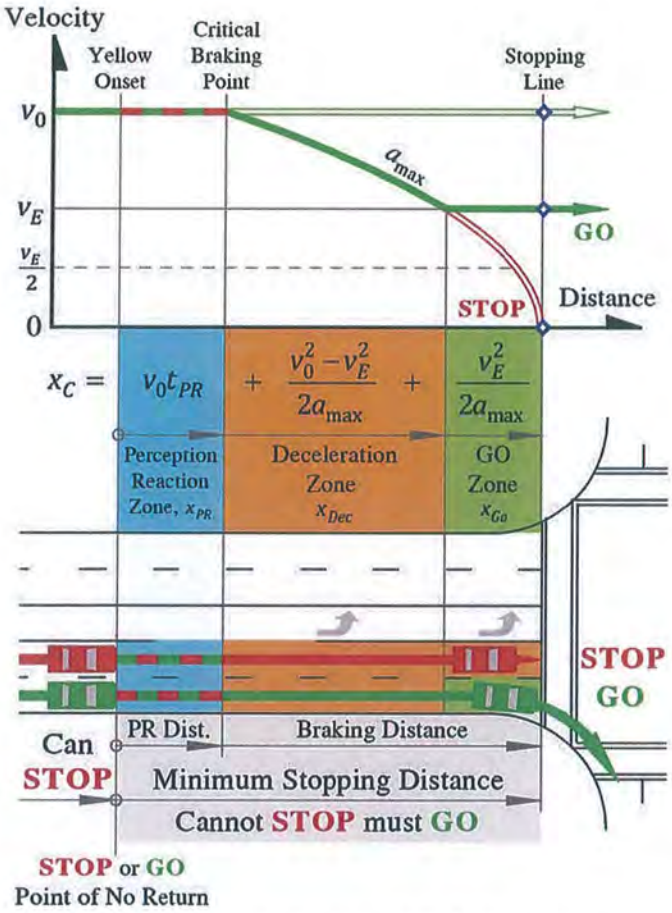



*Figure 3. Zones of driver-vehicle motion while decelerating to negotiate a turn.*

Since the length of the Deceleration Zone ($x_{Dec}$) equals the vehicle's time to traverse the Deceleration Zone ($t_{Dec}$) multiplied by the vehicle's average velocity ($v_{av}$):

$$x_{Dec} = v_{av} t_{Dec} = \frac{(v_0 + v_E)}{2} \cdot \frac{(v_0 - v_E)}{a_{max}} = \frac{v_0^2 - v_E^2}{2a_{max}} \quad (7)$$

And, from the last term of Equation 1, the braking distance is:

$$x_{Br} = \frac{v_0^2}{2a_{max}} \quad (8)$$

The length of the Go Zone is:

$$x_{Go} = x_{Br} - x_{Dec} = \frac{v_0^2}{2a_{max}} - \frac{v_0^2 - v_E^2}{2a_{max}} = \frac{v_E^2}{2a_{max}} \quad (9)$$

The time to traverse the Go Zone ($t_{go}$) equals the length of the Go Zone ($x_{go}$) divided by the vehicle's velocity across this distance (the driver's target entry velocity ($v_E$)):

$$t_{Go} = \frac{x_{Go}}{v_E} = \frac{\frac{v_E^2}{2a_{max}}}{v_E} = \frac{v_E}{2a_{max}} \quad (10)$$

Therefore, the minimum time to traverse the minimum stopping distance (by definition, the minimum yellow change interval, $Y_{min}$) for a vehicle that decelerates within the critical distance to negotiate a turn is given by:

$$Y_{min} = t_{PR} + \frac{(v_0 - v_E)}{a_{max}} + \frac{v_E}{2a_{max}} \quad (11)$$

Algebraic simplification of the Järlström's extended kinematic model shown in Equation 11 yields:

$$Y_{min} = t_{PR} + \frac{v_0 - \frac{1}{2}v_E}{a_{max}} \quad (12)$$

Where ($v_0 \geq v_E > 0$):

$Y_{min}$ = Minimum yellow change interval (s)

$v_0$ = Maximum uniform initial/approach velocity, (ft./s or m/s)

$v_E$ = Maximum intersection entry velocity, (ft./s or m/s)

$t_{PR}$ = Maximum allocated driver-vehicle perception-reaction time, (s)

$a_{max}$ = Maximum uniform safe and comfortable deceleration, (ft./s$^2$ or m/s$^2$)

Figure 4 illustrates the extended kinematic model compared to GHM's STOP or GO solutions across the critical distance ($x_C$) referenced to time.

The validity of Järlström's Extended Kinematic Equation is established in the following manner:

When $v_E = v_0$ (constant velocity), the protocol yields the ITE Kinematic Equation applicable for through movements (Equation 3).

When $v_E = 0$ (zero end velocity), the protocol yields the equation to calculate the minimum time to come to a complete stop:

$$t_{Stop} = t_{PR} + \frac{v_0}{a_{max}} \quad (13)$$

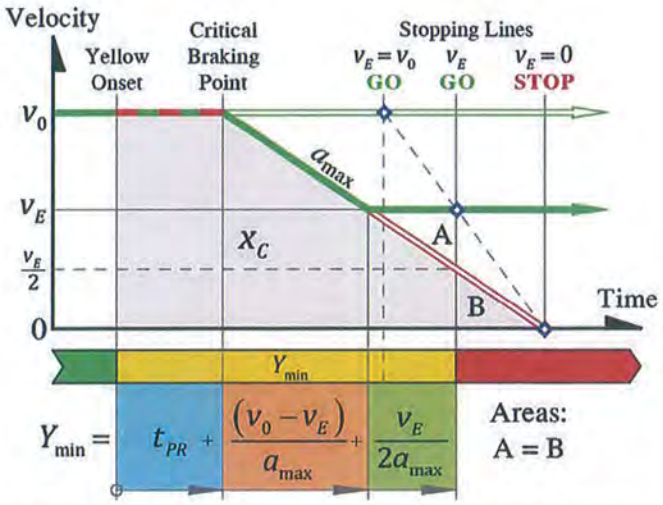



*Figure 4. Time model including vehicle deceleration traversing the minimum stopping distance.*

Note that stopping vehicles will reach the limit line after the signal has changed to red and, for these vehicles, the length of the yellow interval is irrelevant.

## Additional Considerations

1. The methodology for determining the length of the yellow change interval described by both the classic and extended kinematic equations incorporates the following presumptions:
   a) The vehicle travels in free-flow conditions (unimpeded movement, no queue, etc.).
   b) The yellow indication illuminates at the moment the vehicle arrives at the critical distance.
   c) When the yellow illuminates, the vehicle's initial approach velocity ($v_0$) is the actual or estimated 85th percentile speed or the posted limit, whichever is higher.
2. The extended kinematic equation presented here yields the minimum yellow interval for a level intersection approach. As with the kinematic equation for through movements, grade adjustments should be made for vehicles approaching on a downgrade.
3. The assumed intersection entry velocity should be determined using engineering judgment. Generally, drivers entering an intersection to conduct a left turn, do so at approximately 20 miles per hour (mph) (32 kilometers per hour [km/hr]) depending on the intersection radius. Right-turning drivers generally negotiate the turn at approximately 12 mph (19 km/hr). An entry speed can also be estimated based on the *curve design speed* published by ITE.[6] For a full explanation of this calculation, see "Yellow Change Intervals for Turning Movements Using Basic Kinematic Principles," available at www.ite.org/technical-resources/topics/traffic-engineering/traffic-signal-change-and-clearance-intervals.
4. Calculating tolerance is standard engineering practice and should be employed in calculations of the minimum yellow change interval. Perception-reaction time, deceleration, approach velocity, and entry velocity are not constants. A reasonable range of values for each of these parameters is applicable for every driver-vehicle complex approaching a signalized intersection. Driver-vehicles whose metrics fall within a reasonable range but do not strictly match the parameters typically chosen by the traffic engineer should be accommodated.

   For example, research shows that the 85th percentile PRT is closer to 1.5 seconds (sec.) rather than the traditionally accepted PRT of 1.0 sec.[7] Likewise, some drivers, as well as larger vehicles, cannot safely and comfortably decelerate at 10 ft./s$^2$ (3.05 m/s$^2$) and employ a deceleration of 8.0 ft./s$^2$ (2.44 m/s$^2$) or less.[8] Therefore, engineering tolerances should be employed within signal timing protocols to accommodate all reasonable driver-vehicle combinations, especially where the rate of red-light violations is higher than acceptable.
5. The benefit of the extended kinematic equation is to provide a sufficient yellow change interval for all driver-vehicle movements to eliminate the dilemma zone and reduce red-light violations. Practitioners should be aware that red-light violations may increase in turning lanes if the available green time is reduced to accommodate longer yellow intervals. This is especially true where the green interval is insufficient to clear the queue. Rather than reducing the green interval, practitioners may consider increasing the cycle length instead.
6. Practitioners may have concerns about yellow intervals that are "excessive," resulting in drivers stopped at the signal still viewing a yellow indication. However, yellow intervals calculated using the extended solution do not exceed the minimum time required for a vehicle to come to a safe and comfortable STOP (Equation 13). Therefore the circumstance of a stopped driver facing a stale yellow light should typically not occur. **itej**

## References


1. "Traffic Lights Invented by William L. Potts," Mark Traffic. http://www.marktraffic.com/traffic-lights-invented-by-william-l-potts.php. (Accessed January 26, 2020).
2. D. Gazis, R. Herman and A. A. Maradudin, "The Problem of the Amber Signal Light in Traffic Flow," *Operations Research*, vol. 8, no. 1, pp. 112-132, 1960.
3. J. E. Baerwald, "Traffic Signalization, Yellow Interval," in *Traffic Engineering Handbook*, Washington, DC, Institute of Traffic Engineers (ITE), 1965.
4. M. Järlström, "An Extended Kinematic Equation," http://jarlstrom.com/PDF/An Extended Kinematic Equation.pdf. (Accessed January 26, 2020).
5. A. A. Maradudin to the Institute of Transportation Engineers, July 29, 2015. Letter. https://www.thenewspaper.com/rlc/docs/2015/maradudin15.pdf. (Accessed January 26, 2020).
6. *Traffic Engineering Handbook*, 6th Edition. Washington, DC: Institute of Transportation Engineers, 2009.
7. McGee, H., et al. NCHRP Report 731: Guidelines for Timing Yellow and All-Red Intervals at Signalized Intersections. Washington, DC: Transportation Research Board of the National Academies, 2012.
8. Harwood, DW., et al. NCHRP Report 505: Review of Truck Characteristics as Factors in Roadway Design. Washington, DC: Transportation Research Board of the National Academies, 2003.



**Jay Beeber (M)** *is executive director of Safer Streets L.A., a public policy and research organization dedicated to the adoption of scientifically sound and sensible transportation practices. He has authored numerous research reports on transportation safety issues and was a featured presenter at the ITE's Annual Meeting in 2016. He has served on a number of transportation related working groups including subcommittees on Statewide Traffic Signal Timing for the California Traffic Control Devices Committee and the California Zero Fatalities Taskforce.*

8 H

**Antoinette Mann.**

**From:** Anita Mair
**Sent:** Monday, May 18, 2020 9:21 AM
**To:** City Clerk
**Subject:** FW: -EXT- Two Year camera extension on May 18 Ventura agenda
**Attachments:** TrcDocsSanLeanEncrPerm2016engrRepWilldanRecd2017jul26.pdf; TrcaVenturaLTimesRROS2012JulExampOneCamOnly.pdf

**Follow Up Flag:** Flag for follow up
**Flag Status:** Flagged

Good morning,
Please see below/attached Council correspondence regarding Agenda Item 8H.

20 pages

Thank you,
Anita Mair
Executive Assistant
City Manager/City Council Office
City of Ventura
501 Poli Street I Ventura, CA 93001
805-658-7819
www.cityofventura.ca.gov
Stay Safe Ventura - We are Committed to Serving You

**From:** Jim [redacted]

Jim Lissner

**Sent:** Saturday, May 16, 2020 8:35 PM
**To:** Matt LaVere <mlavere@cityofventura.ca.gov>; Sofia Rubalcava <srubalcava@cityofventura.ca.gov>; Lorrie Brown <lbrown@cityofventura.ca.gov>; Jim Friedman <jfriedman@cityofventura.ca.gov>; Cheryl Heitmann <cheitmann@cityofventura.ca.gov>; Erik Nasarenko <enasarenko@cityofventura.ca.gov>; Christy Weir <cweir@cityofventura.ca.gov>; Council <council@cityofventura.ca.gov>
**Subject:** -EXT- Two Year camera extension on May 18 Ventura agenda

5-16-20

Re: May 18 council meeting, item 8H, red light cameras

Honorable Councilmembers:

Even though two councilmembers are brand new to the camera issue and one councilmember has been away from it for 16 years, the staff report does not disclose or discuss the following.

1. During the last 12 months four California cities have shut their programs. Menlo Park, San Mateo, West
Hollywood, and Encinitas. 3/4 of the California cities that once had cameras, no longer do.

2. Redflex' president went to federal prison for bribing municipal officials.

3. By any standard the accident stats in the current report look weak and cherry picked, but they are

just
the latest in a series, starting with the deceptive stats that the police provided to the council in 2015 and 2018 - see my 2018 email, below. If you want stats that you can trust, do as San Leandro did and have a thoroughly independent professional engineer do a report. A copy of the San Leandro report is attached.

4. Even though 2/3 of Ventura's camera tickets are now for left turns the staff report does not discuss the effect
of the longer left turn yellows that will come from a March 2020 ITE decision. Staff also does not explain why the
proportion of left turns has more than doubled since 2015, when it was 32% of Ventura's camera tickets.

5. I hear councilmembers lament
about the size of the fine but then state that their city has no control over the amount of the fine - that it's
set in stone by the Legislature. I want to point out that at least for rolling rights a city CAN reduce the fine. Right now most cities write up their right turn tickets under CVC 21453(a) which carries a fine of $500, even though they have the option to do as the City of LA did before it closed its camera program; LA cited right turns under CVC 21453(b) which has a much lower "base fine" ($35 vs. $100), resulting in a total fine of about $240.

6. Staff has not offered you current copies of the "RROS" (Redflex Redlight Offender Statistics) report, which displays, graphically and on a lane-by-lane basis, the egregiousness
of the violations. I believe that a comparison of some 2019 pre-pandemic RROS to some covering last month
would provide some insight useful to both the council and to the City's traffic engineers. I have asked, repeatedly, for a current copy, but staff claims they cannot run the report anymore, even though Redflex
continues to provide RROS to more than a dozen of its other customers in California. I am attaching the latest Ventura example I have, which is from 2012; to keep the file size down, I have limited the example to the
pages for just one camera.

I would like to suggest that this decision be put off for 60 days so that the council can be provided with responses to the issues above.

Regards,

Jim Lissner

-------- Forwarded Message --------
**Subject:**For May 7 meeting, red light cameras, item 4, Ventura City Council
**Date:**Sun, 6 May 2018 23:38:21 -0700
**From:**Jim <jim@vivahermosa.com>
**Reply-To:**jim@vivahermosa.com

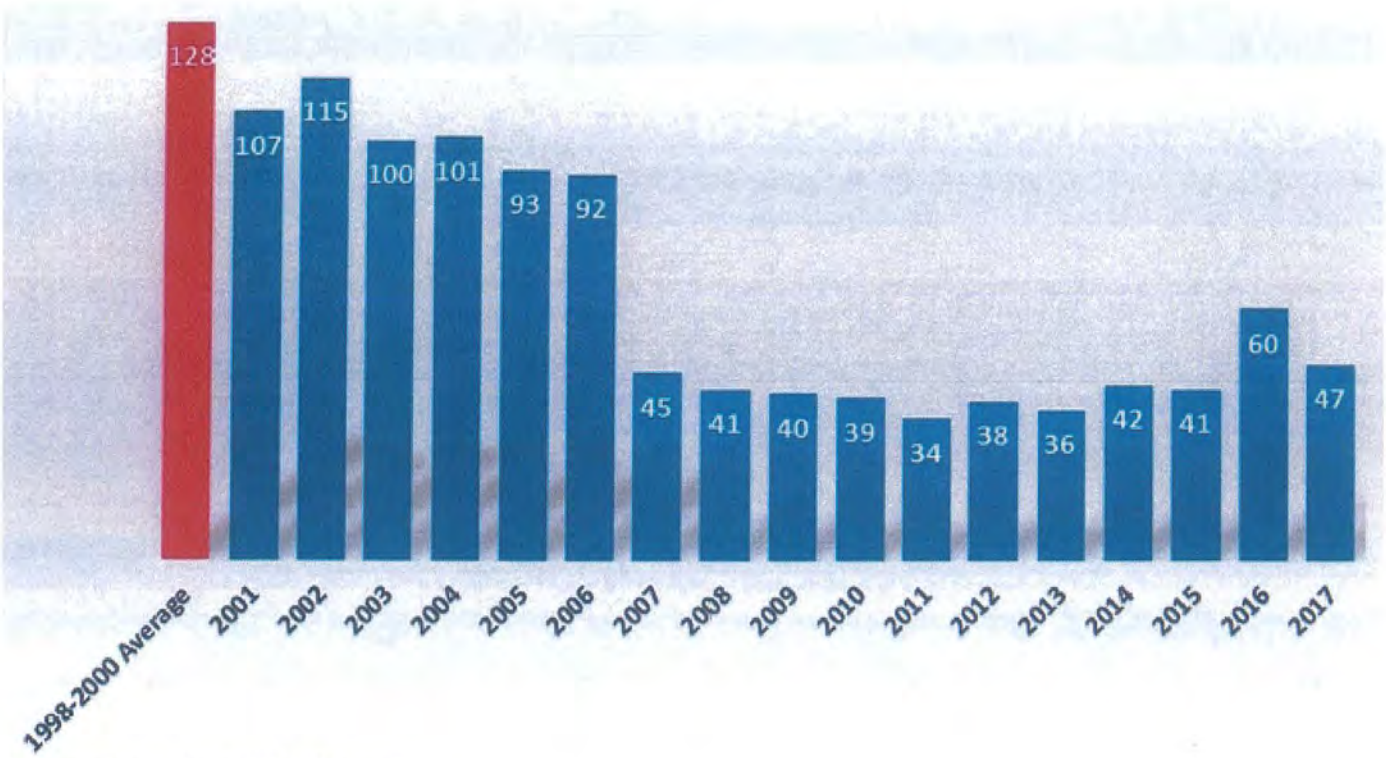
**To:**council@cityofventura.ca.gov, mike.tracy@cityofventura.ca.gov, enasarenko@cityofventura.ca.gov, cheitmann@cityofventura.ca.gov, cmorehouse@cityofventura.ca.gov, jmonahan@cityofventura.ca.gov, cweir@cityofventura.ca.gov, nandrews@cityofventura.ca.gov, mlavere@cityofventura.ca.gov

5-6-18

Re: May 7 council meeting, item 4, red light cameras

Honorable Councilmembers:

On page two of the [2018] staff report is a graph depicting a huge decrease in collisions, supposedly brought about by the installation of the red light cameras.




The graph from the 2018 staff report.

Three years ago staff submitted the same information to you, but in a table. (The image below is from the staff report for the 3-30-15 council meeting.)

| Year | Red light collisions | % Change from 2000 CATSS Launch |
|---|---|---|
| 1998 | 124 | |
| 1999 | 128 | |
| 2000 | 132 | |
| 2001 | 107 | 19% |
| 2002 | 115 | 13% |
| 2003 | 100 | 24% |
| 2004 | 101 | 23% |
| 2005 | 93 | 30% |
| 2006 | 92 | 30% |
| 2007 | 45 | 66% |
| 2008 | 41 | 69% |
| 2009 | 40 | 70% |
| 2010 | 39 | 70% |
| 2011 | 34 | 74% |
| 2012 | 38 | 71% |
| 2013 | 36 | 73% |
| 2014 | 34 | 75% |

That 2015 table showed a remarkable drop after 2006, which prompted a councilmember to inquire about it. Staff's reply (at 3:20:20 in the 3-30-15 video) was:

*"The way the police department reports collisions now is vastly different than we did when we started this program. Now we only report - correct me if I'm wrong - now we only report injury or major property damage collisions. That's different. Our total collision numbers are down quite a bit because the reporting is different."*

With all due respect to City staff, any statistical analysis should be done by a professional with credentials in the field of statistics, one who is free of other ties or contracts with the City.

It is also noticeable that over the years there hasn't been the decline in running and ticketing that is supposed to happen in the presence of heavy enforcement. Instead, there has been a noticeable increase. Here are Ventura's annual totals of tickets, from the highwayrobbery [dot] net website except where noted. [2017 and later totals were added on 5-16-20.]

2001: 3338
2002: 6814
2003: 5576
2004: 4966
2005: 4606
2006: 4360
2007: 4729
2008: 7375
2009: 5500

2010: 4394
2011: 4678
2012: 4322
2013: 5347
2014: 6274
2015: 6882
2016: 8735
2017: 8553 [9604 is total of 12 months of CMRs, not available to me until Aug. 2018, now online at the highwayrobbery [dot] net website]
FY 2016-2017, per staff report, page 2: 9191
[2018: 12200 is total of 12 months of CMRs]
[2019: 9844 is from annual CMR]

Is the increase an attempt to avoid the low-ticketing penalty - like a quota - built into the contract you signed in 2015?

If you decide to stay a decision on the proposed two year extension, would you please publish the new staff report well ahead of time so that I and other members of the public can have more than a weekend to examine the statistics and comment?

Regards,

Jim Lissner

# *Automated Red Light Enforcement (ARLE)*
# *At*
# *East 14th Street-Davis Street*
# *&*
# *East 14th Street-Fairmont Avenue*

## *FINAL REPORT*

***Prepared for:***

**City of San Leandro**

835 East 14th Street
San Leandro, CA 94577
(510) 577-3438

***Prepared by:***

**Willdan Engineering**

9281 Office Park Circle, Suite 100
Elk Grove, California 95758
(510) 695-7434

**July 27, 2016**

## TABLE OF CONTENTS

**AUTOMATED RED LIGHT ENFORCEMENT**
**AT**
**EAST 14TH ST-DAVIS ST and EAST 14TH ST-FAIRMONT AVE**
**CITY OF SAN LEANDRO**

## I. Introduction

The City of San Leandro has maintained an Automated Red Light Enforcement (ARLE) System at four intersections since 2005. Based on a relative new policy (starting in 2015), the City has had to file an annual encroachment permit application to Caltrans to allow the City to continue to maintain and operate the ARLE System at two Caltrans controlled intersections on East 14th Street (State Route-185).

Willdan Engineering has evaluated the ARLE system at two Caltrans intersections (East 14th St / Davis Street-Callan Avenue and East 14th Street / Fairmont Avenue). This report provides a summary of the evaluation, which was done in accordance to Caltrans Traffic Operations Policy Directive 14-01 Revision 1 dated 8/5/15 and titled "Installation of Automated Red Light Enforcement Systems by Local Government Agencies on the State Highway System". The Directive outlines the following tasks (to be completed by 8/1/16):

1. Check Original Signal Warrant
2. Check Signal Timing in General
3. Determination of Yellow Change Interval
4. Analysis of Collision Data to Identify Expected Reduction of Collisions
5. Comparison of Collision Data from Similar Intersections (with and without ARLE)
6. Contact Parties Familiar with the Intersections
7. Field Review both Intersections to Observe Site Conditions and Observe Drivers to Determine their Behavior Patterns
8. Evaluation of Previous Countermeasures
9. Identification and Evaluation of Possible Countermeasures
10. Evaluation of Citations being Issued at the Intersections
11. Document Safety Performance based upon a Systematic Comparison

## II. Original Signal Warrant

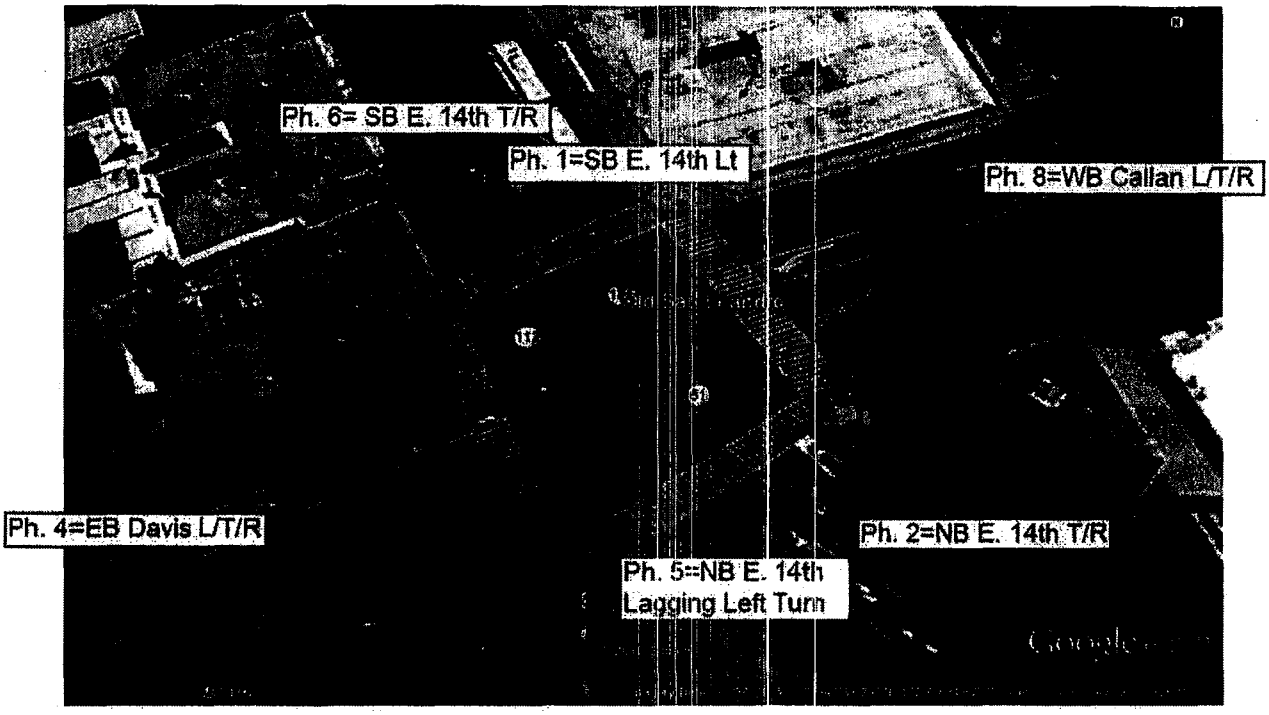
As of 7/25/16, Caltrans has not provided the original signal warrants for either intersection.

## III. General Signal Timing

In an email dated 5/20/16, Caltrans provided the current timing sheets for the two intersections (see Appendix A). The following is a brief summary of the general signal timing information.

### East 14th Street and Davis Street/Callan Avenue

This fully actuated intersection has five signal phases as shown below.



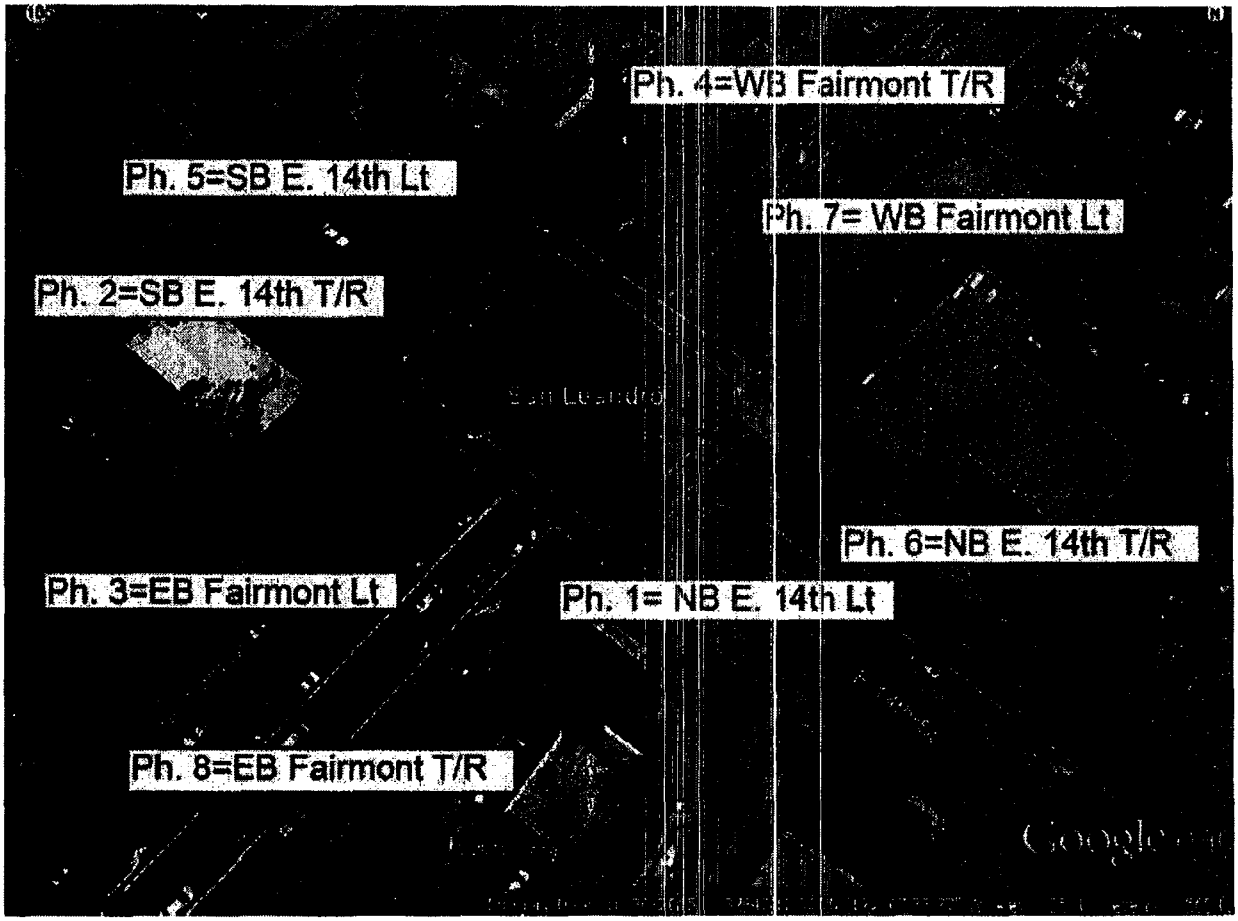

The master controller for this intersection is located at East 14th Street and 136th Avenue. On weekdays, the cycle length is as follows:

- 90 seconds from 7:00 a.m. to 11:00 a.m.
- 85 seconds from 11:00 a.m. to 6:30 p.m.

The "Walk" time at each corner is 7 seconds. The last timing change was on 5/14/15, when "Updated Yellow Time Compliance" was performed

**East 14th Street and Fairmont Avenue**

This fully actuated intersection has eight signal phases as shown below.




The master and slave controllers for this intersection are in the same cabinet that is located on the northeast corner. The cycle length is as follows:

- 85 seconds from 6:30 a.m. to 9:00 a.m. on weekdays
- 95 seconds from 9:00 a.m. to 7 p.m. on weekdays and weekends.

The "Walk" time at each corner is 5 seconds long. The last timing change was on 8/19/15, when "Updated Yellow Time Compliance" was performed.

## IV. Yellow Change Interval

The following table summarizes the yellow time for each of the phases.

| Intersection | Yellow Time in Seconds for Each Signal Phase | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Ph. 1 | Ph. 2 | Ph. 3 | Ph. 4 | Ph. 5 | Ph. 6 | Ph. 7 | Ph. 8 |
| East 14th-Davis | 3.7 | 4.1 | -- | 3.7 | 3.7 | 4.1 | -- | 3.7 |
| East 14th-Fairmont | 3.7 | 4.1 | 3.7 | 4.1 | 3.7 | 4.1 | 3.7 | 4.1 |

Each of the protected left turn movements (i.e., Phases 1, 3, 5 and 7) and the EB Davis (Phase 4)-WB Callan (Phase 8) through movements have a yellow change interval of 3.7 seconds. The 2014 Manual on Uniform Traffic Control Devices (MUTCD) on page 932 states that the minimum yellow interval should be 3.7 seconds for a "Posted Speed or Unposted Prima Facie Speed" of 30 mph. This 3.7 seconds of yellow is appropriate for the through movements as there is a 30 mph speed limit sign posted on eastbound Davis Street east of Clarke Street and on westbound Davis Street west of East 14th Street.

The following movements have a yellow time of 4.1 seconds:

- Northbound East 14th Through at Davis-Callan (Phase 2)
- Southbound East 14th Through at Davis-Callan (Phase 6)
- Southbound East 14th Through at Fairmont (Phase 2)
- Westbound Fairmont Through at East 14th (Phase 4)
- Northbound East 14th Through at Fairmont (Phase 6)
- Eastbound Fairmont Through at East 14th (Phase 8).

The MUTCD states that 4.1-second yellow is the minimum time for a posted speed limit of 35 mph. This 4.1 seconds of yellow is appropriate since there is a 30 mph speed limit sign posted on northbound East 14th north of Chumalia Street, as well as a 35 mph sign posted on northbound East 14th (north of Hesperian Boulevard-Bancroft Avenue) and on eastbound Fairmont (just east of East 14th).

## V. Expected Reduction in Collisions

The ARLE cameras (installed 5/11/06 at East 14th and Davis-Callan) are positioned to catch violators who enter the intersection during the red light for the northbound East 14th through movement at Davis-Callan (see Photo 1).

Photo 1: Camera on East 14th south of Davis pointed at the back of NB vehicles.

Collision diagrams for a nine-year period (1/1/96-12/31/04) before the ARLE was installed and for a 9.5 year period (5/11/06-12/31/15) were reviewed. Since the Police Department quit documenting Property Damage Only (PDO) collisions starting roughly in 2006, the multi-page City of San Leandro Traffic Collision reports were requested for only injury collisions (involving northbound vehicles). More specifically, the collision that occurred on the following dates were evaluated:

- 7/25/00
- 4/14/02
- 8/19/03
- 5/31/09.

After a close review of these reports, it appears that the ARLE would not have prevented the first three collisions (that occurred prior to 2004). As for the 5/31/09 collision, the northbound left turning motorcyclist who hit the pedestrian entered the intersection during the green arrow.

The ARLE at East 14th and Fairmont was installed on 5/11/06 with the intent of catching violators on the eastbound Fairmont approach (see Photo 2).

Photo 2: Cameras on the south side of Fairmont at East 14th.

Using the same process described above resulted in the evaluation of injury collisions involving eastbound Fairmont vehicles that occurred on the following dates:

- 4/12/02
- 5/30/02
- 7/14/02
- 1/30/04
- 7/15/06
- 12/20/06
- 3/30/12
- 12/22/13.

The evaluation reveals that an ARLE would not have prevented any of the four collisions that occurred prior to 2005. Although the ARLE was in place by 2006, it had no bearing on the most recent four collisions. After reviewing over 13 years of collision data for the two intersections, our findings are inconclusive with regards to an ARLE reducing collisions.

## VI. Comparison with Similar Intersections

### ARLE Intersections

The injury plus fatality collision rate at four ARLE intersections were calculated for a nine year period (1/1/96-12/31/04) pre-ARLE and for a nine year period (1/1/07-12/31/15) post-ARLE. The results summarized in the below table indicate that on average that the collision rate was reduced by 47 percent (=0.08/0.17) after the installation of the ARLE.

| Collision Diagram Orientation | | Volume (ADT) | Pre ARLE Injury+Fatal Rate | After ARLE Injury+Fatal Rate | After - Pre Injury+Fatal Rate |
|---|---|---|---|---|---|
| Horizontal | Vertical | | | | |
| Davis | East 14th | 26,100 | **0.22** | **0.10** | -0.12 |
| Fairmont | East 14th | 40,527 | **0.15** | **0.05** | -0.10 |
| Floresta/Halcyon | Washington | 32,970 | **0.18** | **0.14** | -0.04 |
| Marina | Teagarden | 29,700 | **0.16** | **0.06** | -0.10 |
| Totals for 4 ARLE Intersections | | 129,297 | **0.17** | **0.09** | -0.08 |

### Non-ARLE Intersections

The injury plus fatality collision rate at six signalized intersections without ARLE were calculated for the same nine year periods (1/1/96-12/31/04 and 1/1/07-12/31/15). The results summarized in the below table indicate that on average that the collision rate was reduced by 68 percent (=0.21/0.31) during the most recent nine year period.

| Collision Diagram Orientation | | Volume (ADT) | Pre 2005 Injury+Fatal Rate | Post 2006 Injury+Fatal Rate | Post 06-Pre '05 Injury+Fatal Rate |
|---|---|---|---|---|---|
| Horizontal | Vertical | | | | |
| Estudillo | Bancroft | 23,440 | **0.22** | **0.08** | -0.14 |
| Davis | Doolittle | 40,741 | **0.07** | **0.09** | 0.02 |
| Davis | San Leandro | 45,200 | **0.12** | **0.11** | -0.01 |
| Halcyon-Fairmont | Hesperian | 35,840 | **0.14** | **0.08** | -0.06 |
| Marina | Alvarado | 25,990 | **0.08** | **0.08** | 0.00 |
| Marina | Merced | 39,110 | **0.16** | **0.16** | 0.00 |
| San Leandro | Washington | 24,250 | **0.24** | **0.10** | -0.14 |
| Fargo | Washington | 30,560 | **0.19** | **0.10** | -0.09 |
| Totals for 8 Intersections w/o ARLE | | 265,131 | **0.31** | **0.10** | -0.21 |

## VII. Stakeholders Meetings

On May 25, 2016, the Consultant met with the San Leandro Police Officer in charge of issuing the citations generated by ARLE. Soon after the meeting, the Officer provided the citation data used for the analysis provided below in Section X.

The Consultant, San Leandro Traffic Engineering staff, and Caltrans Signal Engineering and Maintenance staff met at Caltrans District 4 on Monday, June 6, 2016. The Meeting Agenda and simplified responses and/or findings from Caltrans staff were as follows:

1. Self-Introductions
2. Purpose of the Meeting
3. Questions for Caltrans Staff:
   a. Has Caltrans had any maintenance or operational issues with the ARLE system at the two intersections? (Response: No)
   b. Has Caltrans ever had to deal directly with Redflex regarding the two intersections? (Response: No)
   c. Has the ARLE system been installed elsewhere within District 4? (Response: No)
   d. What improvements would Caltrans like regarding the ARLE system? (Response: None)
   e. Would Caltrans like ARLE to be installed elsewhere in San Leandro? (Response: Neutral)
   f. What has Caltrans implemented in District 4 to reduce red light violations? (Response: Proper yellow times)
   g. Is there anything else you would like us to know regarding the two intersections or ARLE in general? (Response: No)
4. Close the Meeting

## VIII. Field Review

Half an hour of field observations were conducted at each of the two intersections during the p.m. peak period on Tuesday, May 3, 2016. Special attention was given to the two approaches (i.e., NB East 14th at Davis and EB Fairmont at East 14th) with ARLE to determine if the following signal timing parameters were set properly:

- Green interval (e.g., was there any cycle failure)
- Yellow interval (e.g., is it long enough)
- Pedestrian timing (i.e., activation and duration of Walk &Flashing Don't Walk)
- Volume density timing (e.g., were the phases gapping out appropriately)
- Cycle length (e.g., was it consistent to allow for coordination)
- Activation of ARLE (none was observed).

In general, both intersections appeared to be timed properly and no unusual driving behavior was observed. However, on two separate occasions, a driver attempting a left turn from northbound East 14th at Davis-Callan was observed entering the intersection during the red. Increasing the green time for this movement may help the situation.

## IIX. Previous Countermeasures

As of 7/25/16, Caltrans has not provided information regarding previous countermeasures.

## IX. Possible Countermeasures

After completing the above tasks, a countermeasure has not been identified that would substantially reduce collisions involving red light violators.

## X. Evaluation of Citations

Over roughly a 10 year period (i.e., May 2006-April 2016), a total of 4,190 ARLE citations were issued with the following breakdown:

- NB East 14th approach at Davis-Callan had 882 citations (an average of 7/month)
- EB Fairmont approach at East 14th had 3,308 citations (an average of 28/month).

So four times as many ARLE citations are being issued at East 14th-Fairmont as at East 14th-Davis.

At each intersection, the ARLE captured violators in three approach lanes. The following table summarizes the distribution of citations by approach lane:

| Movement and Lane | Percent (Number) of Citations |
|---|---|
| NB East 14th Left at Davis-Callan | 15% (628) |
| NB East 14th Through at Davis-Callan | 4% (158) |
| NB East 14th Thru or Rt. at Davis (curb lane) | 2% (96) |
| EB Fairmont (#1) Through Lane at East 14th | 4% (184) |
| EB Fairmont (#2) Through at East 14th | 7% (302) |
| EB Fairmont Right at East 14th | 67% (2,822) |

The eastbound Fairmont right-turn movement (in a dedicated right turn only lane) accounted for approximately two-thirds of all the ARLE citations issued for the two intersections. In general, drivers often feel safe completing a right turn without coming to a complete stop because right turns are usually permitted on red.

## XI. Safety Comparison

The best way to compare the traffic safety of similar intersections is to calculate the respective collision rate. Since the San Leandro Police quit documenting PDO collisions, the collision rates calculation was based on Injury + Fatality collisions.

For whatever reason, it appears that the injury plus fatality collision rate at signalized intersections (with or without ARLE) has decreased dramatically over the most recent nine year period (when compared to the previous nine year period). ARLE cannot take credit for this reduction, because the collision rate decreased more at signalized intersections without ARLE.

## XII. Conclusions

Eighteen years of collision data and a decade worth of citations were reviewed for this Study. The findings include the following:

- Collision rate at the four ARLE intersections and the eight non-ARLE intersections are decreasing.
- Two-thirds of the ARLE citations being issued at the two intersections is for the eastbound Fairmont right turn movement at East 14th.
- 62 percent (=782/1,272) of the ARLE citations for the left-turn or through movement at the two intersections were issued for NB East 14th at Davis-Callan.
- ARLE citations are being issued at a rate of roughly 32 per month.

After completing the aforementioned evaluation, it is concluded that the presence of the ARLE cameras (working or not) may be a deterrent to drivers who would spontaneously enter the intersection on red. If the City add one more intersection to continue operation of the ARLE (from a cost-effectiveness point of view), that choice should be East 14th-Fairmont (because it would generate four times as many citations as East 14th-Davis).

## Appendix A

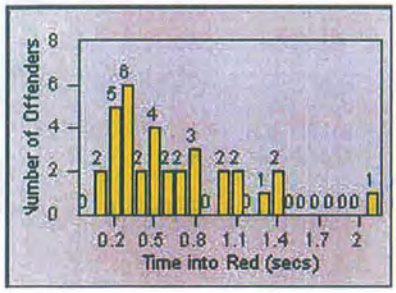
## Signal Timing Sheets

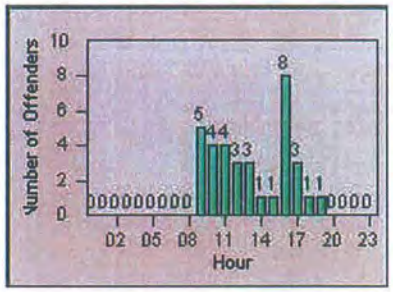
# Redflex Redlight Offender Statistics

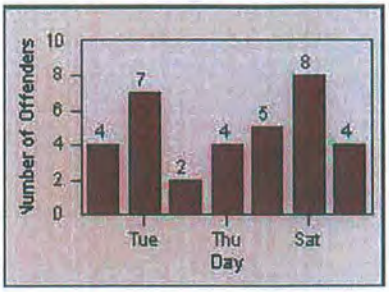
**CONTRACT:** Ventura **LOCATION:** VE-CATH-01 California St and Thompson Blvd

**DATE FROM:** 01-Jul-2012 **DATE TO:** 31-Jul-2012

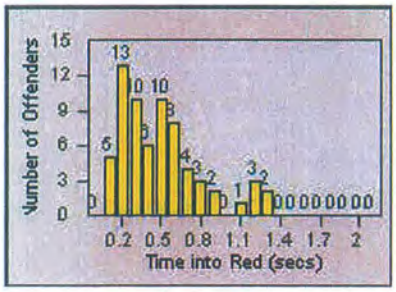
## LANE 1

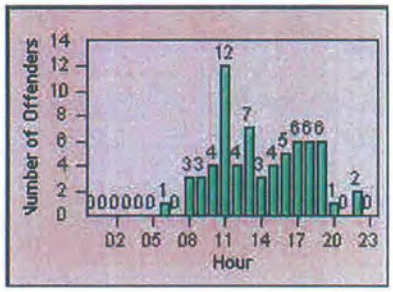


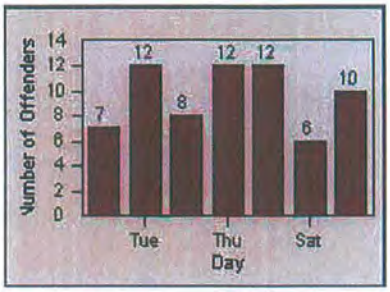



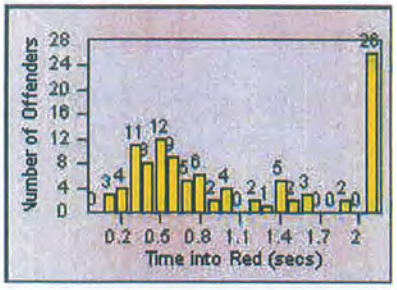

## LANE 2

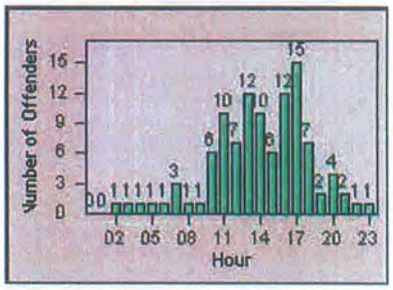


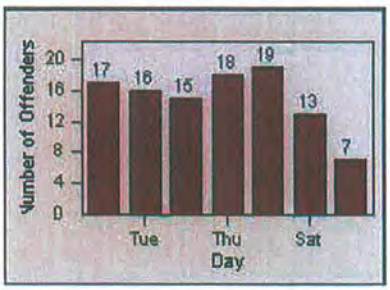




## LANE 3



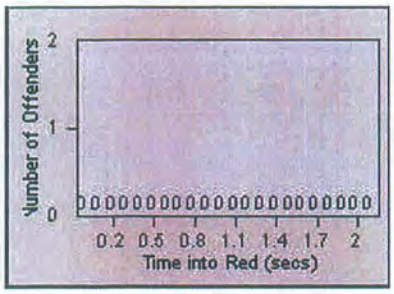



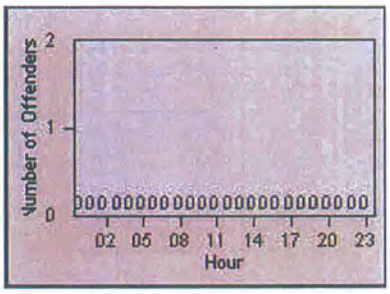



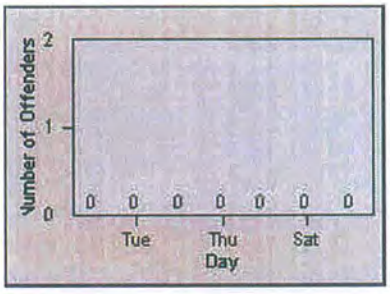
# Redflex Redlight Offender Statistics

**CONTRACT:** Ventura **LOCATION:** VE-CATH-01 California St and Thompson Blvd
**DATE FROM:** 01-Jul-2012 **DATE TO:** 31-Jul-2012

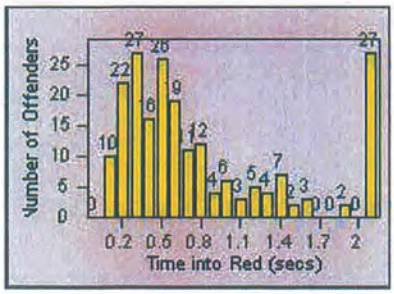
## LANE 4

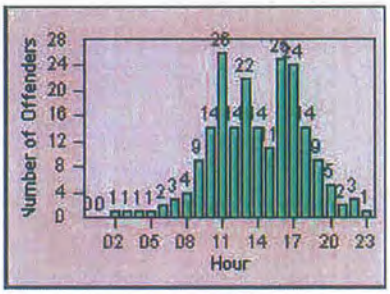


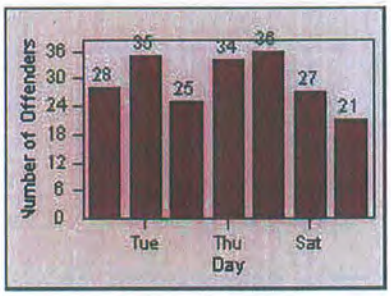




## LANE TOTAL



**Antoinette Mann.** 8H

**From:** Anita Mair
**Sent:** Monday, May 18, 2020 9:21 AM
**To:** City Clerk
**Subject:** FW: -EXT- Red Light Cameras

**Follow Up Flag:** Flag for follow up
**Flag Status:** Flagged

Good morning,
Please see below Council correspondence regarding Agenda Item 8H.

Thank you,
Anita Mair
Executive Assistant
City Manager/City Council Office
City of Ventura
501 Poli Street I Ventura, CA 93001
805-658-7819
www.cityofventura.ca.gov
Stay Safe Ventura - We are Committed to Serving You

**From:** Ken Pergeson <[redacted]>
**Sent:** Sunday, May 17, 2020 10:22 PM
**To:** Matt LaVere <mlavere@cityofventura.ca.gov>; Sofia Rubalcava <srubalcava@cityofventura.ca.gov>; Lorrie Brown <lbrown@cityofventura.ca.gov>; Jim Friedman <jfriedman@cityofventura.ca.gov>; Cheryl Heitmann <cheitmann@cityofventura.ca.gov>; Erik Nasarenko <enasarenko@cityofventura.ca.gov>; Christy Weir <cweir@cityofventura.ca.gov>; Council <council@cityofventura.ca.gov>
**Subject:** -EXT- Red Light Cameras

Hello Council members,

Regarding the public hearing on the red light cameras. I'm a Ventura City resident, I received a ticket from one of the red light cameras in the City of Ventura a few years ago. I was very surprised that I had received the ticket because I consider my self a good driver so I performed some research. I have a few points to make concerning the camera situation.

First, the timing of the lights are setup to the minimal allotted time allowed by law. I would think there should be some leeway built into the timing of the light, even just one extra second would be a fair adjustment especially since there are a lot of elder and out of town drivers in the city.

Secondly, I performed some calculations on the distance of the intersection I had been ticketed at and found the travel distance to be several feet longer than the distance allowed by law for the allowed timing of the red light cameras. The statistics show that the number of tickets in Ventura at red light cameras for left-hand turns through intersections are very much out line compared to the statistics of other cities.

I would have challenged the ticket in court but the the cost of hiring an engineer to create the poof I would have needed to create a defense made that option infeasible to do.

I ask that you cancel the red light cameras in the city, or at the very least perform an audit of the problems and make the corrections along with extending the time by a second or two.

Thank you for your consideration.

Best Regards,

Ken Pergeson

8H

**Antoinette Mann.**

**From:** Anita Mair
**Sent:** Monday, May 18, 2020 11:42 AM
**To:** City Clerk
**Subject:** FW: -EXT- End the Red-Light Cameras Before Venturas Becomes Liable

**Follow Up Flag:** Flag for follow up
**Flag Status:** Flagged

Good morning,
Please see below correspondence regarding Agenda Item 8H.

Thank you,
*Anita Mair*
Executive Assistant
City Manager/City Council Office
City of Ventura
501 Poli Street I Ventura, CA 93001
805-658-7819
www.cityofventura.ca.gov
**Stay Safe Ventura - We are Committed to Serving You**

**From:** [redacted]
**Sent:** Sunday, May 17, 2020 8:50 AM
**To:** Matt LaVere <mlavere@cityofventura.ca.gov>; Sofia Rubalcava <srubalcava@cityofventura.ca.gov>; Lorrie Brown <lbrown@cityofventura.ca.gov>; Jim Friedman <jfriedman@cityofventura.ca.gov>; Cheryl Heitmann <cheitmann@cityofventura.ca.gov>; Erik Nasarenko <enasarenko@cityofventura.ca.gov>; Christy Weir <cweir@cityofventura.ca.gov>; Council <council@cityofventura.ca.gov>
**Subject:** -EXT- End the Red-Light Cameras Before Venturas Becomes Liable

Dear Council,

I am a licensed professional engineer.

The State of California uses the math equation from the Institute of Transportation Engineers (ITE) to calculate the length of the yellow light. On March 2, 2020, ITE formally announced that its equation is a mistake and that this mistake has been forcing for 55 years, innocent drivers to run red lights. To remedy the mistake, ITE changed the federal guidelines for calculating yellows. For turning motions, both right and left, the new yellows are almost twice the current duration – an increase from 3 seconds to about 6 seconds. ITE also now recommends that traffic engineers further lengthen the yellow to accommodate the requirements of commercial vehicles. Up until March 2, ITE had recommended that engineers neglect the extra seconds needed by such vehicles as school buses.

I was a part of the ITE's federal decision. Know that over 90% of your citations and crashes arise from this faulty equation.

To continue your red-light camera program in the light of this knowledge would be to willingly continue to injure the public. You should know that Redflex, as well all the red-light camera companies, have known of these math mistakes for decades. In the case of Redflex, its knowledge of the faulty math can be traced back to North Carolina in 2004, and then publicly documented in its bid proposals to Hampton Roads, Virginia.

My recommendation is to stop your red-light camera program. Your city can be held liable.

Because the police and the public in general are not aware of these engineering mistakes, the prevailing assumption is that drivers are to blame. The assumption is very wrong. The blame falls on the licensed professional engineer, not the driver. To drastically and permanently reduce your red-light running and crash problems, you need to lengthen the yellow lights. Only your traffic engineers have the authority to lengthen yellow lights. However and unfortunately, traffic engineers resist the new ITE recommended practice. For a traffic engineer to adopt the new practice means an exercise in humility. Adopting the new practice means to having had participated in the biggest math mistake of the century, and so having injured tens of millions of innocent people. To remedy the human problem, your California Board of Engineers it as your service. The California Professional Engineers Act section 6701 makes it illegal for a licensed professional engineer, as an individual, to get the math wrong. This is by definition, engineering malpractice. Engineering malpractice is worse than medical malpractice, because a single mistake in engineering affects hundreds of thousands of people all in one shot.

Sincerely,

*Brian Ceccarelli*, **P.E. (North Carolina)**
Principal Engineer
Talus Software, PLLC
http://talussoftware.com
[redacted]
Apex, NC 27539
919-815-0126