
**TRAFFIC
COMMISSION
REGULAR
MEETING**



**SEPTEMBER 18, 2013
7:00 PM**

AGENDA

Ed Rowe - Chair

Donald Froelich – Vice Chair

Steven Beeuwsaert - Commissioner

Michael Caputo - Commissioner

Rick Frazier - Commissioner

Location: City Council Chamber, 24035 El Toro Road, Laguna Hills, California 92653

Any person wishing to address the Traffic Commission on any matter, whether or not it appears on this Agenda, is asked to complete a "Request to Speak" form available on the table at the back of the Chamber. The completed form is to be submitted to the Recording Secretary prior to an individual being heard by the Traffic Commission.

Members of the public wishing to address the Traffic Commission can do so during the Public Comments portion of the Agenda with a time limitation of three minutes per person, an overall time limit of ten minutes for any one subject, and a total time limit of thirty minutes for Public Comments. If you are commenting on an Agenda item, your comments will be heard at the time that item is scheduled on the Agenda. If you are addressing the Commission on an item not listed on the Agenda, the Traffic Commission is prohibited by law from discussing or taking any action on that item.

CALL TO ORDER

Resolution No. 96-04-09-1 established rules of decorum for public meetings held by the City of Laguna Hills. Resolution No. 96-04-09-1 is available on the table at the back of the City Council Chamber.

PLEDGE OF ALLEGIANCE

ROLL CALL OF COMMISSION MEMBERS

1. PUBLIC COMMENTS

This is the time to address the Traffic Commission on any matter not listed on this Agenda that is within the subject matter jurisdiction of the Commission. Public Comments are limited to three minutes per person, an overall time limit of ten minutes for any one subject, and a total time limit of thirty minutes.

2. MINUTES

3. PRESENTATIONS

4. ADMINISTRATIVE REPORTS**4.1 STOP SIGN INSTALLATION ANALYSIS AT BUCKSKIN DRIVE AND
BROKEN BIT LANE**

RECOMMENDATION: THAT THE TRAFFIC COMMISSION RECEIVE AND
FILE THIS REPORT.

5. INFORMATIONAL ITEMS**5.1 SHERIFF'S DEPARTMENT PRESENTATION****5.2 EQUESTRIAN CROSSING TRAFFIC CONTROL UPDATE****5.3 RADAR SPEED TRAILER****6. COMMISSIONER COMMENTS****7. ADJOURNMENT**

The next Regular Meeting of the Traffic Commission will be November 20, 2013, at 7:00 p.m., in the City Council Chamber, located at 24035 El Toro Road, Laguna Hills, California.

CERTIFICATION

I, HUMZA JAVED, Associate Civil Engineer of the City of Laguna Hills, do hereby certify that a copy of the foregoing Agenda was posted at Laguna Hills City Hall, Laguna Hills Community Center, and La Paz Center by Friday, September 13, 2013, at 5:00PM.



HUMZA JAVED
ASSOCIATE CIVIL ENGINEER

September 13, 2013
DATE

In compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting, you should contact the office of the City Engineer at (714) 707-2650. Notification 48 hours prior to the meeting will enable the City to make reasonable arrangements to assure access.

Materials related to an item on this Agenda submitted to the Commission after distribution of the Agenda packet are available for public inspection in the Public Services Department at 24035 El Toro Road, Laguna Hills, California, during normal business hours.

**CITY OF LAGUNA HILLS, CALIFORNIA
TRAFFIC COMMISSION MEETING
MINUTES
JULY 17, 2013**

CALL TO ORDER

The Regular Meeting of the Traffic Commission of the City of Laguna Hills, California, was called to order by Chair Ed Rowe at 7:00 p.m. in the Laguna Hills City Council Chamber, 24035 El Toro Road, Laguna Hills.

PLEDGE OF ALLEGIANCE:

Chair Ed Rowe led the Pledge of Allegiance.

ROLL CALL OF COMMISSION MEMBERS:

Present: Ed Rowe, Chair
 Donald Froelich, Vice Chair
 Steven Beeuwsaert, Commissioner
 Michael Caputo, Commissioner
 Rick Frazier, Commissioner

Absent:

Staff Present: Humza Javed, Associate Civil Engineer; Cindy Sands,
 Administrative Assistant

- 1. PUBLIC COMMENTS**
- 2. MINUTES**

APPROVAL OF MINUTES

IT WAS MOVED BY COMMISSIONER DONALD FROELICH,
SECONDED BY COMMISSIONER RICK FRAZIER, TO APPROVE THE
MINUTES OF THE MAY 15, 2013, TRAFFIC COMMISSION MEETING.

The motion carried by the following vote:

AYES: Commissioners Beeuwsaert, Caputo, and Frazier, and Vice
 Chair Froelich
NOES:
ABSTAIN: Chair Rowe

3. PRESENTATIONS

None

4. ADMINISTRATIVE REPORTS

4.1 VALENCIA ELEMENTARY SCHOOL PARKING ALONG PASEO DE VALENCIA

Staff stated that the Principal of Valencia Elementary School, and a school parent, had contacted the City with a request for additional parking in front of Valencia Elementary school along Paseo de Valencia to address the parking deficiency during student drop-off and pick-up hours. Staff reviewed the background information and history of the City's previous actions regarding parking around Valencia Elementary School. As a result of the current request, staff performed a sight distance evaluation to determine the feasibility of allowing parking between the two parking lot driveways. Due to sight distance constraints for vehicles exiting the north driveway, only sixty feet can be made available for parking, which would accommodate approximately three vehicles. Allowing parking in this area may encourage uncontrolled school-aged pedestrian activity throughout an active parking lot and is not recommended. In order to enhance traffic flow during school drop-off and pick-up hours, staff has extended the green time for the left-turn signal on Paseo de Valencia at La Paz Road. Staff is recommending that the Traffic Commission receive and file this report.

MOTION WAS MADE BY COMMISSIONER CAPUTO,
SECONDED BY COMMISSIONER FRAZIER, TO RECEIVE AND
FILE THIS REPORT.

The motion carried by the following vote:

AYES: Commissioners Beeuwsaert, Caputo, Frazier, Vice
Chair Froelich, and Chair Rowe

NOES:

ABSENT:

4.2 STOP SIGN ANALYSIS ON SUNBURST AVENUE AT LARGO DRIVE

Staff stated that a resident had contacted the City with a request to add a stop sign at the intersection of Sunburst Avenue at Largo Drive. As a

result of this request, staff performed a stop sign analysis in accordance with the California Manual on Uniform Traffic Control Devices (MUTCD). Results of the analysis determined that, based on traffic volumes and speed, a three-year traffic collision history, and roadway geometrics, the intersection did not meet requirements listed in the California MUTCD for the installation of a stop sign at this location. Staff also reviewed a similar analysis performed in 1993, which revealed the same results. Staff is recommending that the Traffic Commission receive and file this report.

MOTION WAS MADE BY COMMISSIONER BEEUWSAERT,
SECONDED BY COMMISSIONER FROELICH, TO RECEIVE AND
FILE THIS REPORT.

The motion carried by the following vote:

AYES: Commissioners Beeuwsaert, Caputo, Frazier, Vice
Chair Froelich, and Chair Rowe

NOES:
ABSENT:

5. INFORMATIONAL ITEMS

5.1 RADAR TRAILER SCHEDULE FOR AUGUST/SEPTEMBER

Staff submitted the schedule for review by the Traffic Commission, asked for any additions, and stated that Empty Saddle Drive would be added to the schedule for September.

5.2 SHERIFF'S DEPARTMENT VERBAL REPORT

Staff not available.

6. COMMISSIONER COMMENTS

Commissioner Froelich asked staff about a project he had read about to widen the sidewalk on La Paz Road, and the grant monies available for this project. Staff stated that the City would be submitting an application to Caltrans for a grant to fund the La Paz Road Sidewalk Widening Project, CIP No. 171, which would widen the sidewalk on the north side of La Paz Road from Paseo de Valencia to Grissom Road and on the south side from Paseo de Valencia to Champlain Road. The project will widen the sidewalk from 4' to 8' and would include the construction of retaining walls, sidewalk, curb, and gutter, and the purchase of right-of-way.

Commissioner Caputo inquired about the attendance of the Sheriff's Department at Traffic Commission meetings. Staff stated that Sergeant Luke South was unable to attend this meeting as he was out of town but would be attendance at future meetings. Commission requested information regarding traffic issues, statistics throughout the City, a map of high accident locations, etc.

7. ADJOURNMENT

There being no further business before the Traffic Commission at this session, Chair Rowe declared the meeting adjourned at 7:28 p.m. to the meeting of September 18, 2013.

Prepared by:

Approved by:

Humza Javed, P.E.
Associate Civil Engineer

Ed Rowe
Chair

**CITY OF LAGUNA HILLS
TRAFFIC COMMISSION
AGENDA REPORT
TRAFFIC ENGINEER DEPARTMENT**

**ISSUE: STOP SIGN INSTALLATION ANALYSIS AT BUCKSKIN DRIVE AND
BROKEN BIT LANE**

SUMMARY:

City staff received a request from a resident of the community to evaluate the need for a stop sign at the intersection of Buckskin Drive and Broken Bit Lane. Upon review, it was determined that a multi-way stop sign is not warranted based on standard guidelines. It is recommended that the Traffic Commission receive and file this report.

BACKGROUND:

Broken Bit Lane is a local curvilinear street traversing in the north-south direction. Buckskin Drive is a local collector curvilinear street traversing in the east-west direction. Both roadways provide space for one lane in each direction, with on-street parking allowed in both directions, and meet in a T-intersection. The speed limit on both roadways is 25 MPH and is posted on Buckskin Drive. Please see attached Vicinity Map.

Ms. Erica Pezold, resident of 25172 Buckskin Drive, contacted City staff regarding the installation of a multi-way stop sign at the T-intersection of Buckskin Drive and Broken Bit Lane. Her concern was speeding vehicles on Buckskin Drive along with visibility constraints. She reported that her son was recently involved in a collision with a vehicle while crossing Buckskin Drive.

Upon receiving the request, staff contracted the services of Hartzog and Crabill, Inc. (HCI) to perform a multi-way stop sign warrant analysis, speed review, and sight-distance review. Based on the guidelines of the California Manual on Uniform Traffic Control Devices (MUTCD), HCI reviewed the accident history, traffic speeds, traffic volumes, and visibility at the intersection. In summary, an accident history review from the California Highway Patrol (CHP) Statewide Integrated Traffic Records System (SWITRS) from March 2007 through March 2012 revealed no accidents. The traffic speed study did not reveal excessive speeds. The traffic volumes were not sufficient to trigger the requirement of a multi-way stop sign at the T-intersection. Moreover, the sight distance analysis revealed adequate stopping sight distance at the intersection. Please see attached report for details.

While unfortunate, one pedestrian/vehicle collision does not justify the installation of a multi-way stop sign at an intersection. Moreover, a stop sign is not to be used as a speed control measure, rather its purpose is to assign right-of-way. Multiple studies have shown no appreciable change in the prevailing speed of traffic on a street by stop signs. Improper use of a stop sign may contribute to increased occurrences of collisions, along

with a general disregard for the traffic control device. In order to address speeding violations, the resident has been informed to contact the Sheriff's Department for speed control.

RECOMMENDATION: THAT THE TRAFFIC COMMISSION RECEIVE AND FILE THIS REPORT.

ATTACHMENTS:

- Vicinity Map
- Hartzog & Crabill, Inc. Report dated August 22, 2013



Trammell Hartzog, President
Jerry Crabill, P.E. (Retired)
Gerald J. Stock, P.E., Executive
Vice-President

17772 E. 17th Street
Suite 101
Tustin, CA 92780

Phone: (714) 731-9455
FAX: (714) 731-9498

www.hartzog-crabill.com

August 22, 2013

Mr. Humza Javed, P.E.
Associate Civil Engineer
City of Laguna Hills
24035 El Toro Road
Laguna Hills, California 92653

**Subject: Stop Sign Analysis at the Intersection of
Buckskin Drive and Broken Bit Lane**

Dear Mr. Javed:

Hartzog & Crabill, Inc. (HCI) has completed a Multi-Way Stop Sign Warrant Analysis for the subject intersection. As you will see in the attached report, no warrants were satisfied, and our recommendation is for denial of a three-way stop sign installation at this intersection. There are no further recommendations.

The analysis was completed in response to the City's request to verify if a multi-way stop sign installation is warranted, and recommended based on meeting standard guidelines. At the present time, the intersection has no regulatory sign control on any approach to the intersection. The California Manual of Uniform Traffic Control Devices (*California MUTCD*) was used for defining the requirements for a multi-way stop sign installation.

It has been our pleasure to prepare this analysis for the City of Laguna Hills. If you have any questions or need more information please call (714) 731-9455.

Very truly yours,
HARTZOG & CRABILL, INC.

A handwritten signature in blue ink, appearing to read 'Gerald J. Stock', is written over a horizontal line.

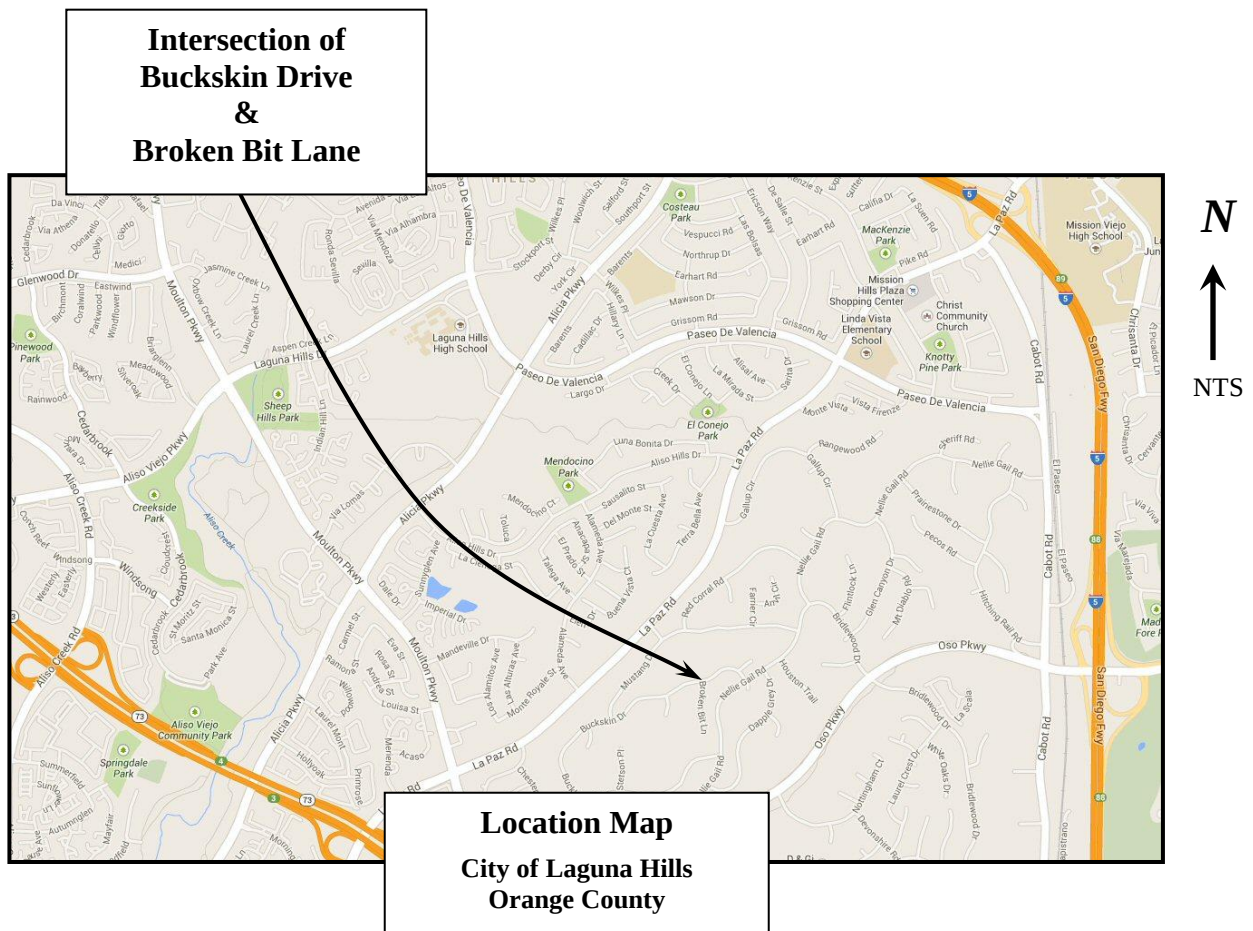
Gerald J. Stock, P.E.
Vice President
City & Traffic Engineering Services

Attach: Multi-way Stop Control Warrants Analysis Report

MULTI-WAY STOP CONTROL WARRANTS ANALYSIS BUCKSKIN DRIVE AT BROKEN BIT LANE IN THE CITY OF LAGUNA HILLS, CA

INTRODUCTION

The City of Laguna Hills requested Hartzog & Crabill, Inc. (HCI) to complete a Multi-way Stop Warrants Analysis at the intersection of Buckskin Drive and Broken Bit Lane. This analysis was completed in order to verify if a multi-way stop sign installation is warranted and recommended based on meeting standard guidelines. The location is a T-intersection with Buckskin Drive running in the east-west directions and Broken Bit Lane running north-south (south of Buckskin Drive). The intersection is located west of the Interstate 5 Freeway, between La Paz Road and Oso Parkway (see *Location Map below*). The intersection is entirely within the City of Laguna Hills' jurisdiction. Presently, there are no STOP signs posted or markings for any approach to this intersection.



BACKGROUND

Buckskin Drive is a 40-foot wide, curvy, east-west local collector roadway with primarily residential frontage on both sides of the street. The two-lane roadway provides for one lane of traffic in each direction, which are not separated by any centerline striping. The roadway is fully-improved with concrete rolled curb and gutter on both sides, and sidewalk on the north-side only. Buckskin Drive has a posted speed limit of 25 miles per hour (MPH). On-street parking is allowed on both sides of the roadway. There is no regulatory signage controlling traffic on Buckskin Drive (uncontrolled) at its intersection with Broken Bit Lane.

See Exhibit 1 (next page) for photo images of Buckskin Drive.

Broken Bit Lane is a 34-foot wide, curved, north-south local cul-de-sac roadway with residential frontage on both sides. Broken Bit Lane has a northerly terminus at its intersection with Buckskin Drive. The two-lane roadway provides for one lane of traffic in each direction, which are not separated by any striping. The roadway is fully-improved with concrete rolled curb and gutter on both sides (no sidewalk). Broken Bit Lane does not have a posted speed limit; however, the residential nature of this street results in a ‘*prima facie*’ speed limit of 25 MPH and does not require posting. On-street parking is allowed on both sides of the roadway. There is no regulatory signage controlling traffic on Broken Bit Lane (uncontrolled) at its intersection with Buckskin Drive.

See Exhibit 2 (following page) for a photo image of Broken Bit Lane.

EXHIBIT 1

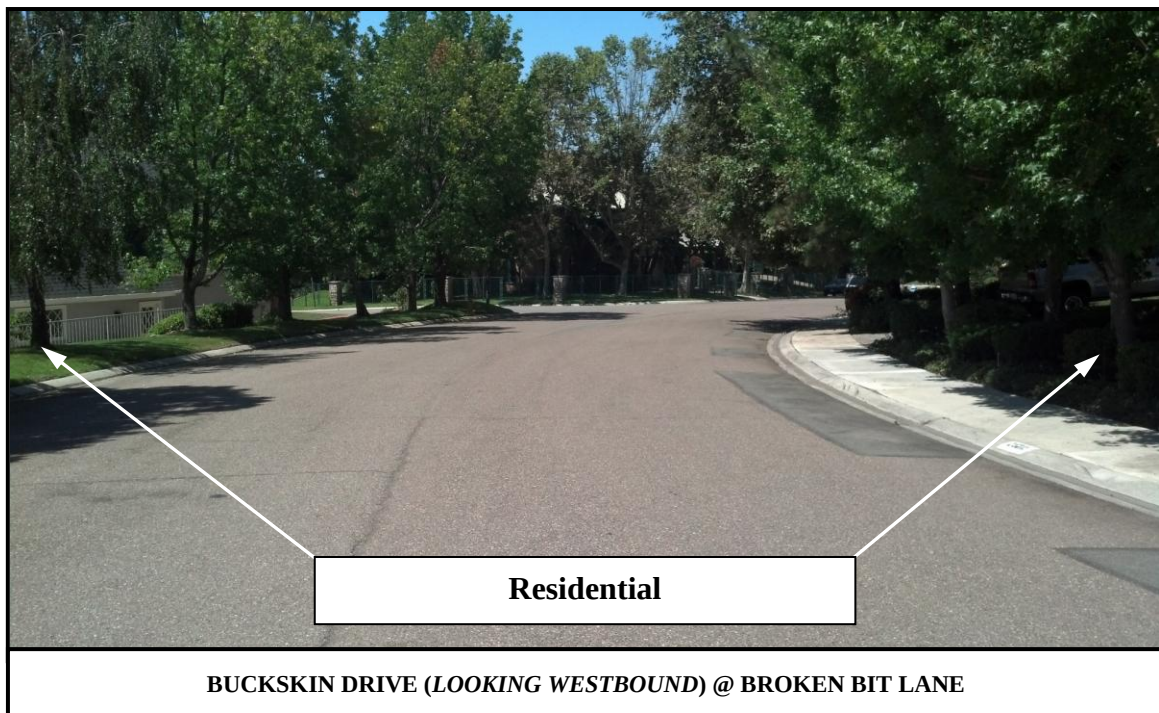


EXHIBIT 2



WARRANT GUIDELINES

As is common practice with many municipal agencies, the City of Laguna Hills follows State guidelines for determining if traffic control devices, such as multi-way stop signs, should be installed. Therefore, the prevailing source used for this analysis is the State of California Manual of Uniform Traffic Control Devices (*California MUTCD*). The California MUTCD contains minimum guidelines regarding traffic volumes, collisions, speeds, visibility, and other criteria in order to satisfy the requirements, in this case, for the recommendation and installation of a two-way or multi-way stop.

The California MUTCD Multi-way Stop Applications Guidance criteria are described in the following four main parts:

- 1) As an interim measure where traffic control signals are justified;
- 2) Reported crashes – five or more in a 12-month period that are susceptible to correction by a multi-way stop installation;
- 3) Minimum traffic and pedestrian volumes, speeds, and delay; and,
- 4) Where a combination of the above criteria are all satisfied to 80 percent.

If any one, or a combination, of these criteria is met, then a multi-way stop application should be considered. If these criteria are not met, the installation of an unwarranted stop sign installation is typically not recommended as it may place the City in a position of potential liability.

The California MUTCD guidelines describing Right-of-Way at Intersections, STOP Sign Applications, Multi-way Stop Applications, and Yield Sign Applications are included in Appendix A.

MULTI-WAY STOP ANALYSIS

The California MUTCD Multi-way Stop Applications section contains guidelines, such as minimum collisions and traffic volumes necessary for the justification of multi-way stop control. The general guidelines given for a stop sign application begin with using engineering judgment for the installation of a stop sign(s) on a street entering a through highway and where high speeds on the cross street make entry difficult, or due to restricted view, or when crash records indicate a need for control by a stop sign.

Further guidance criteria found in the California MUTCD include the following important statements: ***“YIELD or STOP signs should not be used for speed control... In most cases, the street carrying the lowest volume of traffic should be controlled... A YIELD or STOP sign should not be installed on the higher volume roadway unless justified by an engineering study... Multi-way stop control is used where the volume of traffic on the intersecting roads is approximately equal.”***

Collision History

The guidelines for Multi-way Stop Applications contained in the California MUTCD regarding collisions, or crashes, require a minimum of five (5) reported crashes occurring in a 12-month period that are susceptible to correction by a multi-way stop installation in order to satisfy this warrant. Such crashes include right- and left-turn collisions, as well as right-angle collisions (i.e., broadside, or head-on) and pedestrian-vehicle collisions. The available accident history for the intersection was gathered from the California Highway Patrol (CHP) Statewide Integrated Traffic Records System (SWITRS). A comprehensive 5-year traffic collision history summary report was prepared for this intersection and reviewed for collisions susceptible to correction by the installation of a multi-way stop. Table 1 (*next page*) provides the most recent summary of collision history occurring at or near this intersection.

All traffic collision data collected for this intersection is included in Appendix B.

Collision History (continued)

TABLE 1

SWITRS COLLISION SUMMARY

Intersection	2007-09		2010		2011		Jan-Mar 2012	
	Date	Type of Coll. / Correctible?	Date	Type of Coll. / Correctible?	Date	Type of Coll. / Correctible?	Date	Type of Coll. / Correctible?
Buckskin Drive at Broken Bit Lane		None Reported		None Reported		None Reported		None Reported

Notes: Information above is derived per the latest 5-year intersection traffic collision database report provided by the CHP SWITRS.

- 1) Type of Coll. = Type of Collision (*i.e., broadside, rear-end, etc.*)
- 2) Correctible? = Yes / No

As shown, there have been (0) reported collisions at/near the intersection during the past (5) years of available SWITRS data. The City of Laguna Hills received a report from a resident of a vehicle vs. pedestrian collision at the intersection on June 30, 2013, which was not included in the SWITRS data (reports through March 2012). Since the collision warrant requires a minimum of (5) reported crashes, susceptible to correction by a multi-way stop, to occur within a 12-month period, the collision warrant is not satisfied.

Traffic Volumes

HCI collected Average Daily Traffic (ADT) vehicular approach counts on Wednesday, August 7, 2013 in order to account for vehicles that typically use this intersection. The 24-hour traffic count for Buckskin Drive is 386 vehicles with the highest AM peak-hour volume of 30 vehicles and the highest PM peak-hour volume of 36 vehicles. The 24-hour traffic count for Broken Bit Lane is 104 vehicles per day with the highest AM peak-hour volume of 9 vehicles and the highest PM peak-hour volume of 13 vehicles. Table 2 below provides a breakdown of the approach volumes.

All traffic volume data collected for this intersection is included in Appendix C.

Traffic Volumes (continued)

TABLE 2
VEHICULAR ADT COUNT DATA

Street	Direction	24-Hour Volume	Directional Split	Highest Hourly Volume
Buckskin Drive	Eastbound	192	50%	19 (2:00–3:00PM)
	Westbound	194	50%	20 (5:00–6:00PM)
Broken Bit Lane				
	Northbound	104	100%	13 (5:00–6:00PM)

Buckskin Drive is considered the ‘through’ or ‘major’ street due to the intersection geometry, roadway traffic volumes, and being the ‘top’ of the T-intersection. Moreover, Broken Bit Lane is considered the ‘minor’ street as it is a cul-de-sac, and northbound traffic does have to slow or stop at the intersection before proceeding left or right on Buckskin Drive.

It can be expected that the traffic volumes on the minor street are considerably less than those on the major street. As can be seen from the table above, this is the case, as Buckskin Drive carries approximately (79%) of the entire traffic entering the intersection.

A part of the California MUTCD guideline criteria also calls for a reduction in the required minimum volumes when the critical approach speed (*or 85th-percentile speed*) on the major street exceeds 40 MPH. If this is the case, the minimum vehicular volumes to be met for a multiway stop installation are reduced to 70%. As both roadways have a posted or un-posted ‘*prima facie*’ residential speed limit of 25 MPH, the 70% minimum volumes for a multi-way stop sign analysis are not applicable.

Traffic Volumes (continued)

It is important to note that the hourly vehicle traffic counts shown in Table 2 above are given for the highest hour of traffic for each direction, and serve as a good indicator to compare with the required minimum hourly traffic volumes in the California MUTCD multi-way stop guidelines. It should also be mentioned that the average hourly minimum volumes for a multi-way stop application are to be satisfied for any eight (8) hours of an average day.

Table 3 below shows the California MUTCD minimum traffic volume guidelines for a Multi-way Stop Application in comparison with the highest 8-hour traffic count data at this intersection. Both Parts 1 and 2 of the minimum volume warrants below must be satisfied in order to fulfill the traffic volume warrant.

TABLE 3

**MULTIWAY STOP SIGN WARRANT FOR MINIMUM TRAFFIC VOLUMES
BUCKSKIN DRIVE AT BROKEN BIT LANE**

Part 1. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any (8) hours of an average day, <u>Results:</u> No, average (30) vehicles per hour Meets only 10% of required average major street hourly traffic volumes	<i>and</i>	Part 2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same (8) hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour, <u>Results:</u> No, average (9) vehicles per hour Meets only 5% of required minor street hourly traffic volumes	<i>but</i>	Part 3. If the 85th -percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are (70) percent of the above values. <u>Results:</u> No < 40 MPH Posted 25 MPH
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As shown above, the average hourly intersection approach traffic volumes for the highest 8-hour period did not satisfy both Parts 1 and 2 required volumes (*10% major street / 5% minor street*). Consequently, the traffic volume warrant is not satisfied.

Speeds

Both Buckskin Drive and Broken Bit Lane have a posted or *prima facie* speed limit of 25 MPH. A 24-hour speed profile was also performed on Buckskin Drive, west of Broken Bit Lane, on Wednesday, August 7, 2013 resulting in an average speed of 24 MPH and an 85th percentile speed (critical speed) of 31 MPH. These speeds correspond to the expected speeds on two-lane local collector, or residential, roadways. Field observations also confirmed that vehicles were not regularly speeding over this speed limit near the intersection, but were typical for an urbanized two-lane local roadway environment.

Visibility

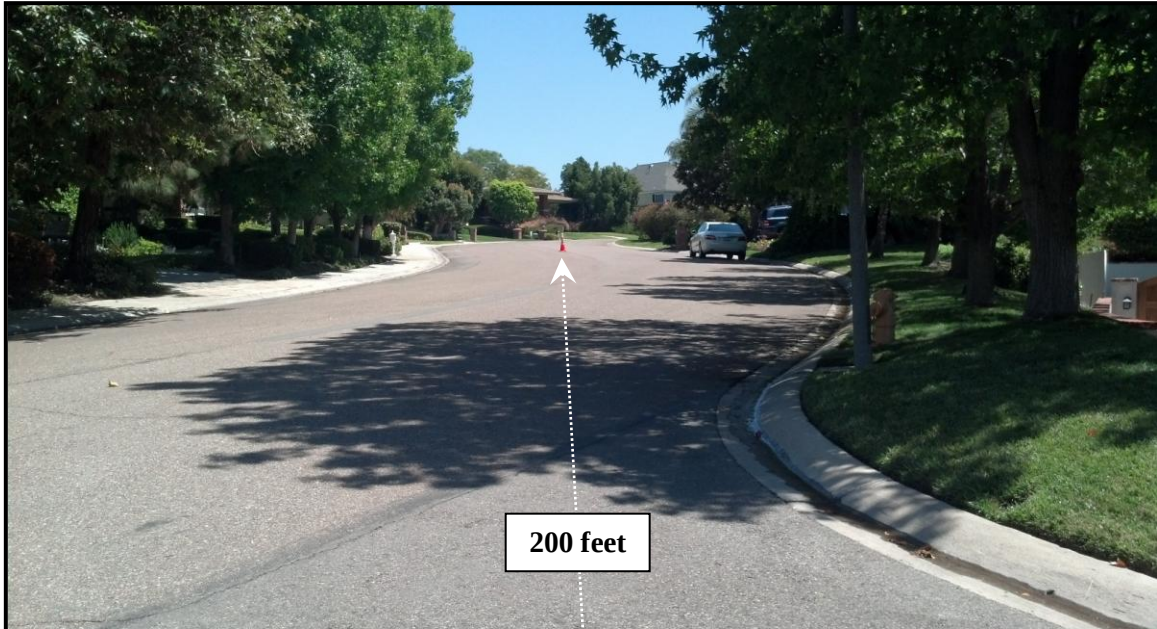
Impaired visibility, or sight distance, due to the geometry of the intersection was carefully considered during our field-review of the surrounding urban residential environment. The geometry of the intersection does have slight horizontal and vertical curvature; however, it was determined in the field that special traffic signage for improved visibility of the intersection, or other advanced signage, is not necessary.

Driver sight distance was measured from Broken Bit Lane. The measured distance was derived from the stopping sight distance guidelines found in the California MUTCD (*see Appendix D*). In this reference, a 25 MPH roadway speed recommends a minimum Stopping Sight Distance of 155 feet, while 30 MPH recommends 200 feet. As the 85th percentile speed was just above 30 MPH, a 200 foot sight distance was used for our evaluation. More specifically, this stopping sight distance was field-measured from a typical ‘stopped’ vehicle location on Broken Bit Lane towards the oncoming lanes of traffic on Buckskin Drive. An orange cone was set at this minimum distance, and a photograph was then taken from the stopped vehicle’s perspective.

(See sight distance photos in Exhibit 4 on the following page).

As Exhibit 4 shows, sight distance when looking from Broken Bit Lane did have a clear line of sight to the cone. Consequently, the minimum stopping visibility is considered satisfied.

EXHIBIT 4



BROKEN BIT LANE (SOUTH-SIDE - LOOKING EAST) @ BUCKSKIN DRIVE



BROKEN BIT LANE (SOUTH-SIDE - LOOKING WEST) @ BUCKSKIN DRIVE

MULTIWAY STOP ANALYSIS SUMMARY

The analysis of the four (4) main criteria provided in the California MUTCD regarding Multi-way Stop Applications showed that this intersection did not meet the minimum guidelines to justify stopping the major roadway (Buckskin Drive). The four main criteria analyzed were: 1) As an interim measure where traffic control signals are justified; 2) Reported collisions – a correctible crash problem; 3) Traffic and pedestrian volumes, speeds, and delay; and 4) Where a combination of the above criteria are satisfied to 80 percent.

In summary, the collision history at the intersection resulted in (0) SWITRS-reported collisions during the last (5) years of available data, and one resident-reported collision in June 2013, where the minimum guideline calls for at least five (5) correctible collisions in a 12-month period. The average minimum hourly traffic volumes for a multi-way stop that are to be satisfied for any eight (8) hours in an average day were also not close to being satisfied. Excessive delay to the minor roadway was not observed in terms of waiting for a gap on the major roadway. Therefore, since intersection collision history and traffic volumes do not satisfy the minimum volumes, it can also be derived that a traffic signal is not justified at this intersection. The 80% combined criteria were also not met as both the collision history and minimum traffic volumes guidelines were not satisfied to this percentage.

Nonetheless, engineering judgment should always be included in any decision regarding traffic safety improvements. Intersection lighting was verified and found to be adequate as there was typical local roadway lighting on one street light post located on the southeast corner. Further intersection information was gathered in the field in regards to pedestrian, bicycle, and equestrian activity which was determined as low-to-moderate activity. In terms of visibility and roadway curvature, it was determined in the field that this intersection does not require further consideration for any special signage, since the minimum sight distance was satisfied.

CONCLUSION / RECOMMENDATION

In overall consideration of the existing conditions at the intersection of Buckskin Drive and Broken Bit Lane, and no warrants found satisfied, a multi-way stop sign installation is not recommended at this time. There are no further recommendations.

APPENDIX A

**MULTIWAY STOP APPLICATIONS
GUIDELINES:**

CALIFORNIA MUTCD

Standard:

03 Except as provided in Paragraphs 4 and 5, the minimum sizes for regulatory signs facing traffic on multi-lane conventional roads shall be as shown in the Multi-lane column of Table 2B-1 and 2B-1(CA).

Option:

04 Where the posted speed limit is 35 mph or less on a multi-lane highway or street, other than for a STOP sign, the minimum size shown in the Single Lane column in Table 2B-1 and 2B-1(CA) may be used.

05 Where a regulatory sign, other than a STOP sign, is placed on the left-hand side of a multi-lane roadway in addition to the installation of the same regulatory sign on the right-hand side or the roadway, the size shown in the Single Lane column in Table 2B-1 and 2B-1(CA) may be used for both the sign on the right-hand side and the sign on the left-hand side of the roadway.

Standard:

06 A minimum size of 36 x 36 inches shall be used for STOP signs that face multi-lane approaches.

07 Where side roads intersect a multi-lane street or highway that has a speed limit of 45 mph or higher, the minimum size of the STOP signs facing the side road approaches, even if the side road only has one approach lane, shall be 36 x 36 inches.

08 Where side roads intersect a multi-lane street or highway that has a speed limit of 40 MPH or lower, the minimum size of the STOP signs facing the side road approaches shall be as shown in the Single Lane or Multi-lane columns of Table 2B-1 and 2B-1(CA) based on the number of approach lanes on the side street approach.

Guidance:

09 The minimum sizes for regulatory signs facing traffic on exit and entrance ramps should be as shown in the column of Table 2B-1 and 2B-1(CA) that corresponds to the mainline roadway classification (Expressway or Freeway). If a minimum size is not provided in the Freeway column, the minimum size in the Expressway column should be used. If a minimum size is not provided in the Freeway or Expressway Column, the size in the Oversized column should be used.

Section 2B.04 Right-of-Way at Intersections

Support:

01 State or local laws written in accordance with the "Uniform Vehicle Code" (see Section 1A.11) establish the right-of-way rule at intersections having no regulatory traffic control signs such that the driver of a vehicle approaching an intersection must yield the right-of-way to any vehicle or pedestrian already in the intersection. When two vehicles approach an intersection from different streets or highways at approximately the same time, the right-of-way rule requires the driver of the vehicle on the left to yield the right-of-way to the vehicle on the right. The right-of-way can be modified at through streets or highways by placing YIELD (R1-2) signs (see Sections 2B.08 and 2B.09) or STOP (R1-1) signs (see Sections 2B.05 through 2B.07) on one or more approaches.

Guidance:

02 Engineering judgment should be used to establish intersection control. The following factors should be considered:

- A. Vehicular, bicycle, and pedestrian traffic volumes on all approaches;**
- B. Number and angle of approaches;**
- C. Approach speeds;**
- D. Sight distance available on each approach; and**
- E. Reported crash experience.**

03 YIELD or STOP signs should be used at an intersection if one or more of the following conditions exist:

- A. An intersection of a less important road with a main road where application of the normal right-of-way rule would not be expected to provide reasonable compliance with the law;**
- B. A street entering a designated through highway or street; and/or**
- C. An unsignalized intersection in a signalized area.**

04 In addition, the use of YIELD or STOP signs should be considered at the intersection of two minor streets or local roads where the intersection has more than three approaches and where one or more of the following conditions exist:

- A. The combined vehicular, bicycle, and pedestrian volume entering the intersection from all approaches averages more than 2,000 units per day;*
- B. The ability to see conflicting traffic on an approach is not sufficient to allow a road user to stop or yield in compliance with the normal right-of-way rule if such stopping or yielding is necessary; and/or*
- C. Crash records indicate that five or more crashes that involve the failure to yield the right-of-way at the intersection under the normal right-of-way rule have been reported within a 3-year period, or that three or more such crashes have been reported within a 2-year period.*

05 YIELD or STOP signs should not be used for speed control.

Support:

06 Section 2B.07 contains provisions regarding the application of multi-way STOP control at an intersection.

Guidance:

07 Once the decision has been made to control an intersection, the decision regarding the appropriate roadway to control should be based on engineering judgment. In most cases, the roadway carrying the lowest volume of traffic should be controlled.

08 A YIELD or STOP sign should not be installed on the higher volume roadway unless justified by an engineering study.

Support:

09 The following are considerations that might influence the decision regarding the appropriate roadway upon which to install a YIELD or STOP sign where two roadways with relatively equal volumes and/or characteristics intersect:

- A. Controlling the direction that conflicts the most with established pedestrian crossing activity or school walking routes;*
- B. Controlling the direction that has obscured vision, dips, or bumps that already require drivers to use lower operating speeds; and*
- C. Controlling the direction that has the best sight distance from a controlled position to observe conflicting traffic.*

Standard:

10 Because the potential for conflicting commands could create driver confusion, YIELD or STOP signs shall not be used in conjunction with any traffic control signal operation, except in the following cases:

- A. If the signal indication for an approach is a flashing red at all times;**
- B. If a minor street or driveway is located within or adjacent to the area controlled by the traffic control signal, but does not require separate traffic signal control because an extremely low potential for conflict exists; or**
- C. If a channelized turn lane is separated from the adjacent travel lanes by an island and the channelized turn lane is not controlled by a traffic control signal.**

10a **STOP signs shall not be erected at any entrance to an intersection controlled by traffic signals. Refer to CVC 21355(a).**

11 Except as provided in Section 2B.09, STOP signs and YIELD signs shall not be installed on different approaches to the same unsignalized intersection if those approaches conflict with or oppose each other.

12 Portable or part-time STOP or YIELD signs shall not be used except for emergency and temporary traffic control zone purposes.

13 A portable or part-time (folding) STOP sign that is manually placed into view and manually removed from view shall not be used during a power outage to control a signalized approach unless the maintaining agency establishes that the signal indication that will first be displayed to that approach upon restoration of power is a flashing red signal indication and that the portable STOP sign will be manually removed from view prior to stop-and-go operation of the traffic control signal.

Option:

14 A portable or part-time (folding) STOP sign that is electrically or mechanically operated such that it only displays the STOP message during a power outage and ceases to display the STOP message upon restoration of power may be used during a power outage to control a signalized approach.

Support:

¹⁵ Section 9B.03 contains provisions regarding the assignment of priority at a shared-use path/ roadway intersection.

Section 2B.05 STOP Sign (R1-1) and ALL WAY Plaque (R1-3P)

Standard:

⁰¹ When it is determined that a full stop is always required on an approach to an intersection, a STOP (R1-1) sign (see Figure 2B-1) shall be used.

⁰² The STOP sign shall be an octagon with a white legend and border on a red background.

⁰³ Secondary legends shall not be used on STOP sign faces.

⁰⁴ At intersections where all approaches are controlled by STOP signs (see Section 2B.07), an ALL WAY supplemental plaque (R1-3P) shall be mounted below each STOP sign. The ALL WAY plaque (see Figure 2B-1) shall have a white legend and border on a red background.

⁰⁵ The ALL WAY plaque shall only be used if all intersection approaches are controlled by STOP signs.

⁰⁶ Supplemental plaques with legends such as 2-WAY, 3-WAY, 4-WAY, or other numbers of ways shall not be used with STOP signs.

Support:

⁰⁷ The use of the CROSS TRAFFIC DOES NOT STOP (W4-4P) plaque (and other plaques with variations of this word message) is described in Section 2C.59.

Guidance:

⁰⁸ Plaques with the appropriate alternative messages of TRAFFIC FROM LEFT (RIGHT) DOES NOT STOP (W4-4aP) or ONCOMING TRAFFIC DOES NOT STOP (W4-4bP) should be used at intersections where STOP signs control all but one approach to the intersection, unless the only non-stopped approach is from a one-way street.

Option:

⁰⁹ An EXCEPT RIGHT TURN (R1-10P) plaque (see Figure 2B-1) may be mounted below the STOP sign if an engineering study determines that a special combination of geometry and traffic volumes is present that makes it possible for right-turning traffic on the approach to be permitted to enter the intersection without stopping.

Support:

¹⁰ The design and application of Stop Beacons are described in Section 4L.05.

¹¹ A STOP (R1-1) sign is not a "cure-all" and is not a substitute for other traffic control devices. Often, the need for a STOP (R1-1) sign can be eliminated if the sight distance is increased by removing obstructions.

Through Highways

Option:

¹² STOP (R1-1) signs may be installed either at or near the entrance to a State highway, except at signalized intersections, or at any location so as to control traffic within an intersection. Refer to CVC 21352 and 21355. See Section 1A.11 for information regarding this publication.

Support:

¹³ When STOP (R1-1) signs or traffic control signals have been erected at all entrances, a highway constitutes a through highway. Refer to CVC 600.

¹⁴ Authority to place STOP (R1-1) signs facing State highway traffic is delegated to the Department of Transportation's District Directors.

Option:

¹⁵ Local authorities may designate any highway under their jurisdiction as a through highway and install STOP (R1-1) signs in a like manner. Refer to CVC 21354.

Standard:

¹⁶ No local authority shall erect or maintain any STOP (R1-1) sign or other traffic control device requiring a stop, on any State highway, except by permission of the Department of Transportation. Refer to CVC 21353.

Support:

¹⁷ The Department of Transportation will grant such permission only when an investigation indicates that the STOP (R1-1) sign will benefit traffic.

Section 2B.06 STOP Sign Applications

Guidance:

- 01 At intersections where a full stop is not necessary at all times, consideration should first be given to using less restrictive measures such as YIELD signs (see Sections 2B.08 and 2B.09).*
- 02 The use of STOP signs on the minor-street approaches should be considered if engineering judgment indicates that a stop is always required because of one or more of the following conditions:*
 - A. The vehicular traffic volumes on the through street or highway exceed 6,000 vehicles per day;*
 - B. A restricted view exists that requires road users to stop in order to adequately observe conflicting traffic on the through street or highway; and/or*
 - C. Crash records indicate that three or more crashes that are susceptible to correction by the installation of a STOP sign have been reported within a 12-month period, or that five or more such crashes have been reported within a 2-year period. Such crashes include right-angle collisions involving road users on the minor-street approach failing to yield the right-of-way to traffic on the through street or highway.*

Support:

- 03 The use of STOP signs at grade crossings is described in Sections 8B.04 and 8B.05.*

Section 2B.07 Multi-Way Stop Applications

Support:

- 01 Multi-way stop control can be useful as a safety measure at intersections if certain traffic conditions exist. Safety concerns associated with multi-way stops include pedestrians, bicyclists, and all road users expecting other road users to stop. Multi-way stop control is used where the volume of traffic on the intersecting roads is approximately equal.*

- 02 The restrictions on the use of STOP signs described in Section 2B.04 also apply to multi-way stop applications.*

Guidance:

- 03 The decision to install multi-way stop control should be based on an engineering study.*
- 04 The following criteria should be considered in the engineering study for a multi-way STOP sign installation:*
 - A. Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.*
 - B. Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.*
 - C. Minimum volumes:*
 - 1. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and*
 - 2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but*
 - 3. If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.*
 - D. Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.*

Option:

- 05 Other criteria that may be considered in an engineering study include:*
 - A. The need to control left-turn conflicts;*
 - B. The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;*
 - C. Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop; and*
 - D. An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection.*

Section 2B.08 YIELD Sign (R1-2)

Standard:

01 The YIELD (R1-2) sign (see Figure 2B-1) shall be a downward-pointing equilateral triangle with a wide red border and the legend YIELD in red on a white background.

Support:

02 The YIELD sign assigns right-of-way to traffic on certain approaches to an intersection. Vehicles controlled by a YIELD sign need to slow down to a speed that is reasonable for the existing conditions or stop when necessary to avoid interfering with conflicting traffic.

Section 2B.09 YIELD Sign Applications

Option:

01 YIELD signs may be installed:

- A. On the approaches to a through street or highway where conditions are such that a full stop is not always required.**
- B. At the second crossroad of a divided highway, where the median width at the intersection is 30 feet or greater. In this case, a STOP or YIELD sign may be installed at the entrance to the first roadway of a divided highway, and a YIELD sign may be installed at the entrance to the second roadway.**
- C. For a channelized turn lane that is separated from the adjacent travel lanes by an island, even if the adjacent lanes at the intersection are controlled by a highway traffic control signal or by a STOP sign.**
- D. At an intersection where a special problem exists and where engineering judgment indicates the problem to be susceptible to correction by the use of the YIELD sign.**
- E. Facing the entering roadway for a merge-type movement if engineering judgment indicates that control is needed because acceleration geometry and/or sight distance is not adequate for merging traffic operation.**

Standard:

02 A YIELD (R1-2) sign shall be used to assign right-of-way at the entrance to a roundabout. YIELD signs at roundabouts shall be used to control the approach roadways and shall not be used to control the circulatory roadway.

03 Other than for all of the approaches to a roundabout, YIELD signs shall not be placed on all of the approaches to an intersection.

Section 2B.10 STOP Sign or YIELD Sign Placement

Standard:

01 The STOP or YIELD sign shall be installed on the near side of the intersection on the right-hand side of the approach to which it applies. When the STOP or YIELD sign is installed at this required location and the sign visibility is restricted, a Stop Ahead sign (see Section 2C.36) shall be installed in advance of the STOP sign or a Yield Ahead sign (see Section 2C.36) shall be installed in advance of the YIELD sign.

02 The STOP or YIELD sign shall be located as close as practical to the intersection it regulates, while optimizing its visibility to the road user it is intended to regulate.

02a YIELD signs shall not be erected upon the approaches to more than one of the intersecting streets. Refer to CVC 21356.

03 STOP signs and YIELD signs shall not be mounted on the same post.

04 No items other than inventory stickers, sign installation dates, and bar codes shall be affixed to the fronts of STOP or YIELD signs, and the placement of these items shall be in the border of the sign.

05 No items other than official traffic control signs, inventory stickers, sign installation dates, anti-vandalism stickers, and bar codes shall be mounted on the backs of STOP or YIELD signs.

06 No items other than retroreflective strips (see Section 2A.21) or official traffic control signs shall be mounted on the fronts or backs of STOP or YIELD signs supports.

06a If other signs are grouped with a STOP sign, except for ONE WAY (R6-1 & R6-2) signs and Street Name (D3-1 or G7-1(CA)) signs (see Sections 2B.40 & 2D.43), they shall be installed below the STOP sign.

Guidance:

07 STOP or YIELD signs should not be placed farther than 50 feet from the edge of the pavement of the intersected roadway (see Drawing F in Figure 2A-3).

APPENDIX B

SWITRS COLLISION HISTORY

CITY OF LAGUNA HILLS
INTERSECTION OF BUCKSKIN DRIVE AND BROKEN BIT LANE
SWITRS COLLISION DATABASE
01/01/2007 - 03/31/2012

9/18/2013 ITEM NO. 4.1

ITEM	COLLISION		COLL.	PRIMARY ROAD	SECONDARY ROAD	DIST.	DIR.	INTER.	WEATH.	COLL.	PRIM.	PCF	HIT	TYPE	MOTOR	
	ID	DATE	TIME								COLL.	VIOL	AND	OF	VEHICLE	
									1	SEVERITY	COLL. FACT.	CAT.	RUN	COLL.	INVOLVED WITH	ROAD SURF.
	Reported to SWITRS.															

ES:

Weather 1	Collision Severity	Primary Collision Factor	PCF Violation Category	Hit and Run	Type of Collision
A - Clear	1 - Fatal	A - (Vehicle) Code Violation	01 - Driving or Bicycling Under Influence	F - Felony	A - Head-On
B - Cloudy	2 - Injury (Severe)	B - Other Improper Driving	02 - Impeding Traffic	M - Misdemeanor	B - Sideswipe
C - Raining	3 - Injury (Other Visible)	C - Other Than Driver	03 - Unsafe Speed	N - Not Hit & Run	C - Rear-End
D - Snowing	4 - Injury (Complaint of Pain)	D - Unknown	04 - Following Too Closely		D - Broadside
E - Fog	0 - PDO (Property Damage Only)	E - Fell Asleep	05 - Wrong Side of Road		E - Hit Object
F - Other		- - Not Stated	06 - Improper Passing		F - Overturned
G - Wind			07 - Unsafe Lane Change		G - Vehicle/Pedestrian
- - Not Stated			08 - Improper Turning		H - Other
			09 - Automobile ROW		- - Not Stated
			10 - Pedestrian ROW		
			11 - Pedestrian Violation		
			12 - Traffic Signals and Signs		
			13 - Hazardous Parking		
			14 - Lights		
			15 - Brakes		
			16 - Other Equipment		
			17 - Other Hazardous Violation		
			18 - Other Than Driver (or Ped)		
			19 -		
			20 -		
			21 - Unsafe Starting or Backing		
			22 - Other Improper Driving		
			23 - Pedestrian or "Other" Under the Influence		
			24 - Fell Asleep		
			00 - Unknown		
			- - Not Stated		

Motor Vehicle Involved With:

- A - Non-Collision
- B - Pedestrian
- C - Other Motor Vehicle
- D - Motor Vehicle on Other Roadway
- E - Parked Motor Vehicle
- F - Train
- G - Bicycle
- H - Animal
- I - Fixed Object
- J - Other Object
- - Not Stated

Road Surface

- A - Dry
- B - Wet
- C - Snowy or Icy
- D - Slippery
- - Not Stated

APPENDIX C

INTERSECTION COUNT DATA

Volumes for: Wednesday, August 07, 2013				City: Laguna Hills		Daily Totals				Total
Location: Broken Bit Ln & Buckskin Dr				Project: 13-1196-001		NB	SB	EB	WB	
						104	0	192	194	490

AM Period	NB	SB	EB	WB	PM Period	NB	SB	EB	WB
00:00	0		1	1	12:00	3		3	5
00:15	0		1	0	12:15	2		5	6
00:30	1		0	0	12:30	0		5	2
00:45	0	1	0	2	12:45	4	9	4	17
01:00	1		0	1	13:00	1		3	4
01:15	0		0	0	13:15	2		4	0
01:30	0		0	0	13:30	4		2	5
01:45	0	1	0	1	13:45	2	9	3	12
02:00	0		0	0	14:00	2		2	1
02:15	0		0	0	14:15	0		4	2
02:30	0		0	0	14:30	2		6	1
02:45	0		0	0	14:45	1	5	7	19
03:00	0		0	0	15:00	2		4	1
03:15	0		0	0	15:15	1		3	3
03:30	0		0	0	15:30	3		3	5
03:45	0		0	0	15:45	1	7	2	12
04:00	0		0	0	16:00	1		5	8
04:15	0		0	0	16:15	1		5	4
04:30	0		1	0	16:30	3		2	5
04:45	1	1	1	2	16:45	1	6	5	17
05:00	0		0	1	17:00	0		0	4
05:15	0		0	0	17:15	6		2	4
05:30	0		1	0	17:30	4		9	9
05:45	0		2	3	17:45	3	13	1	12
06:00	0		0	0	18:00	2		3	5
06:15	0		0	0	18:15	1		5	3
06:30	0		1	0	18:30	2		2	6
06:45	2	2	1	2	18:45	2	7	4	14
07:00	2		2	0	19:00	0		1	2
07:15	2		1	4	19:15	1		2	4
07:30	1		2	1	19:30	2		0	4
07:45	1	6	1	6	19:45	1	4	1	4
08:00	0		1	3	20:00	0		0	3
08:15	1		2	4	20:15	3		4	1
08:30	2		2	1	20:30	1		0	3
08:45	1	4	5	10	20:45	0	4	1	5
09:00	1		2	2	21:00	0		1	0
09:15	3		2	1	21:15	1		2	1
09:30	3		6	2	21:30	1		1	1
09:45	0	7	1	11	21:45	0	2	1	5
10:00	3		5	1	22:00	0		2	0
10:15	1		2	1	22:15	0		1	3
10:30	3		3	5	22:30	0		2	0
10:45	0	7	8	18	22:45	0		0	5
11:00	2		3	4	23:00	0		1	0
11:15	5		2	1	23:15	0		0	1
11:30	2		4	3	23:30	0		1	0
11:45	0	9	3	12	23:45	0		2	4

Total Vol.	38	66	56	160	66	126	138	330	
Daily Totals :					NB	SB	EB	WB	Total
					104	0	192	194	490
AM					PM				
Split %	23.8%	41.3%	35.0%	32.7%	20.0%	38.2%	41.8%	67.3%	
AM					PM				
Peak Hr.	10:30	10:00	11:30	10:30	Peak Hr.	17:15	14:15	15:30	17:15
Volume	10	18	17	41	Volume	15	21	21	51
P.H.F.	0.500	0.563	0.708	0.788	P.H.F.	0.625	0.750	0.656	0.580
7 - 9 Vol.	10	16	21	47	4 - 6 Vol.	19	29	39	87
Peak Hr.	07:00	08:00	07:15	08:00	Peak Hr.	17:00	16:00	17:00	16:45
Volume	6	10	12	26	Volume	13	17	20	46
18/2013 ITEM NO. 4.1			0.750	0.650	P.H.F.	0.542	0.850	0.556	0.523

SPEED

Buckskin Dr w/o Broken Bit Ln

Day: Wednesday

Date: 8/7/2013

City: Laguna Hills

Project #: CA13_1196_001

Summary

Time	< 15	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 +	Total
00:00 AM	0	0	0	1	1	1	0	0	0	0	0	0	0	3
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	1	2	0	0	0	0	0	0	0	0	0	0	3
05:00	0	0	0	2	2	0	0	0	0	0	0	0	0	4
06:00	1	0	2	3	0	0	0	0	0	0	0	0	0	6
07:00	1	2	6	6	1	0	0	0	0	0	0	0	0	16
08:00	3	3	4	12	2	0	0	0	0	0	0	0	0	24
09:00	1	5	5	7	0	1	0	0	0	0	0	0	0	19
10:00	4	6	8	11	3	0	0	0	0	0	0	0	0	32
11:00	2	3	6	9	6	1	0	0	0	0	0	0	0	27
12:00 PM	1	4	11	12	5	0	0	0	0	0	0	0	0	33
13:00	1	2	3	8	5	0	0	0	0	0	0	0	0	19
14:00	1	5	9	13	3	1	0	0	0	0	0	0	0	32
15:00	3	4	7	8	6	2	0	0	0	0	0	0	0	30
16:00	5	2	10	12	4	1	0	0	0	0	0	0	0	34
17:00	2	1	12	3	6	0	0	0	0	0	0	0	0	24
18:00	1	2	9	12	7	0	0	0	0	0	0	0	0	31
19:00	0	1	5	5	1	0	0	0	0	0	0	0	0	12
20:00	0	2	7	3	0	1	0	0	0	0	0	0	0	13
21:00	1	2	1	2	0	0	0	0	0	0	0	0	0	6
22:00	0	4	1	1	2	0	0	0	0	0	0	0	0	8
23:00	0	0	1	4	1	0	0	0	0	0	0	0	0	6
Totals	27	49	109	134	55	8								382
% of Totals	7%	13%	29%	35%	14%	2%								100%

AM Volumes	12	20	33	51	15	3	0	0	0	0	0	0	0	134
% AM	3%	5%	9%	13%	4%	1%								35%
AM Peak Hour	10:00	10:00	10:00	08:00	11:00									10:00
Volume	4	6	8	12	6	1								32
PM Volumes	15	29	76	83	40	5	0	0	0	0	0	0	0	248
% PM	4%	8%	20%	22%	10%	1%								65%
PM Peak Hour	16:00	14:00	17:00	14:00	18:00	15:00								16:00
Volume	5	5	12	13	7	2								34
Directional Peak Periods			AM 7-9			NOON 12-2			PM 4-6			Off Peak Volumes		
All Speeds			Volume		%	Volume		%	Volume		%	Volume		%
			40	↔	10%	52	↔	14%	58	↔	15%	232	↔	61%

Street Name	Direction	Percentiles					
		15th	50th	Average	85th	95th	ADT
Buckskin Dr	Summary	18	25	24	31	34	382

9/18/2013 ITEM NO. 4.1

APPENDIX D

STOPPING SIGHT DISTANCE AS A FUNCTION OF SPEED

CALIFORNIA MUTCD

Table 6C-1. Recommended Advance Warning Sign ~~Minimum~~ Spacing

Road Type	Distance Between Signs*		
	A	B	C
Urban (low speed) - 25 mph or less	100 feet	100 feet	100 feet
Urban (high speed) - more than 25 mph to 40 mph	250 feet	250 feet	250 feet
Urban (high speed) - more than 40 mph	350 feet	350 feet	350 feet
Rural	500 feet	500 feet	500 feet
Expressway / Freeway	1,000 feet	1,500 feet	2,640 feet

* ~~Speed category to be determined by the highway agency.~~

** The column headings A, B, and C are the dimensions shown in Figures 6H-1 through 6H-46. The A dimension is the distance from the transition or point of restriction to the first sign. The B dimension is the distance between the first and second signs. The C dimension is the distance between the second and third signs. (The "first sign" is the sign in a three-sign series that is closest to the TTC zone. The "third sign" is the sign that is furthest upstream from the TTC zone.)

Table 6C-2. Stopping Sight Distance as a Function of Speed

Speed*	Distance
20 mph	115 feet
25 mph	155 feet
30 mph	200 feet
35 mph	250 feet
40 mph	305 feet
45 mph	360 feet
50 mph	425 feet
55 mph	495 feet
60 mph	570 feet
65 mph	645 feet
70 mph	730 feet
75 mph	820 feet

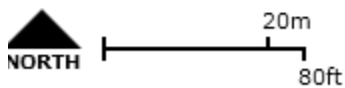
* Posted speed, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed.

Can also be used as Stopping Sight Distance as suggested buffer space length or location for flagger station.

Table 6C-3. Taper Length Criteria for Temporary Traffic Control Zones

Type of Taper	Taper Length
Merging Taper	at least L
Shifting Taper	at least 0.5 L
Shoulder Taper	at least 0.33 L
One-Lane, Two-Way Traffic Taper	50 feet minimum, 100 feet maximum
Downstream Taper	50 feet minimum, 100 feet maximum

Note: Use Table 6C-4 to calculate L



Date: 09/10/13

Vicinity Map



CITY OF LAGUNA HILLS

OCTOBER 2013

RADAR TRAILER SCHEDULE

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
6	7	8 Stageline W/O Hidden Trail 25 MPH	9 Santa Vittoria N/O Ridge Route 30 MPH	10 Mustang W/O Farrier 25 MPH	11	12
13	14	15	16	17	18	19
20	21	22 Lost Colt W/O Stageline 25 MPH	23 Glen Canyon S/O Nellie Gail 25 MPH	24 Rapid Falls W/O Sundowner 25 MPH	25	26
27	28	29	30	31		

CITY OF LAGUNA HILLS

November 2013

RADAR TRAILER SCHEDULE

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
3	4	Nellie Gail N/O Empty Saddle 25 MPH	5 Woodbluff S/O Middleridge 25 MPH	6 Bridlewood S/O Laurel Crest 25 MPH	7	8
10	11		12	13	14	15
						16
17	18	Santa Vittoria N/O Ridge Route 30 MPH	19 Lost Colt E/O Breargrass 25 MPH	20	21	22
						23
24	25		26	27	28 HOLIDAY	29 HOLIDAY
						30

Rainy Days Excluded