

2017 ENGINEERING AND TRAFFIC SURVEY



Prepared for:

Mr. Mike Roberts, PE
Public Works Director/City Engineer

City of Hercules

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Prepared by:

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672 Gordon Lum, TE #1542
Licensed CA Traffic Engineer

12/4/17

Date

November 30, 2017

Mr. Mike Roberts
Public Works Director/City Engineer
City of Hercules
111 Civic Drive
Hercules, CA 94519
MikeRoberts@ci.hercules.ca.us (via email only)

Subject: 2017 Engineering and Traffic Surveys

Dear Mr. Roberts:

As requested, Willdan has completed an Engineering and Traffic Survey to justify and update the posted speed limits along 15 street segments in the City of Hercules. These segments require an update to comply with the 5-year limitation set forth in the California Vehicle Code (CVC).

We are pleased to submit the enclosed Report that describes the E&T survey procedures and contains recommendations for posted speed limits on the City's arterial and collector street system. A summary of these recommendations is included in the Analysis. Supporting documentation for each speed zone recommendation is provided in the Appendices.

The Report was conducted in accordance with applicable provisions of the CVC, following procedures outlined in the California Manual on Uniform Traffic Control Devices dated November 2014, and as required by Section 627 of the CVC. The Report is intended to satisfy the requirements of Section 40802 of the CVC to enable the continued use of radar for traffic speed enforcement.

We appreciate the opportunity to serve the City of Hercules and the assistance and cooperation afforded to us during this study.

Very truly yours,

WILLDAN ENGINEERING



Gordon Lum, T.E.
Traffic Engineer II

Enclosure

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INTRODUCTION

This Engineering and Traffic Survey is intended to be the basis for the establishment, revision, and enforcement of speed limits for selected streets within the City of Hercules. This Engineering and Traffic Survey presents recommended speed limits for 15 street segments in the City of Hercules. Engineering and Traffic Surveys are required by the State of California to establish intermediate speed limits on local streets and to enforce those limits using radar or other speed measuring devices. These surveys must be updated every 5 or 7 years to ensure the speeds reflect current conditions as dictated by the California Vehicle Code (CVC). The CVC also requires that the surveys be conducted based on the methodology required by the California Manual on Uniform Traffic Control Devices (California MUTCD) dated November 2014.

The survey was requested by the City for the proper posting of speed limits and to enable the Hercules Police Department to utilize radar or other electronic speed measuring devices for speed enforcement. CVC Sections 40801 and 40802 require Engineering and Traffic Surveys that verify the prima facie speed limit before enforcement by such a device is legal. The law further specifies that these surveys be conducted every 5 years. The surveys can be extended to 7 years provided the City's officer(s) have completed a 24-hour radar operator course [CVC 40802(c)(2)(B)(i)(I)]. Additionally, some surveys may be extended to 10 years if a traffic engineer certifies that no changes in roadway or traffic conditions have occurred [CVC 40802 (c)(2)(B)(i)(II)]. These provisions assure that posted speed limits are kept reasonably current.

The Engineering and Traffic Surveys for the City were conducted in accordance with procedures outlined in the California MUTCD and as required by Section 627 of the CVC. The CVC further describes three elements of an engineering and traffic survey:

1. Measurement of prevailing speed;
2. Collision history; and
3. Roadway characteristics not readily apparent to the motorist.

Posted speed limits are established primarily to protect the general public from the reckless and unpredictable behavior of dangerous drivers. They provide law enforcement with a clearly understood method to identify and apprehend violators of the basic speed law (CVC Section 22350). This law states that "No person shall drive a vehicle on a highway at a speed greater than is reasonable or prudent having due regard for weather, visibility, the traffic on, and the surface and width of the highway, and in no event at a speed which endangers the safety of persons or property." The posted speed limit gives motorists a clear warning of the maximum speed that is reasonable and prudent under typical driving conditions.

The basic fundamentals for establishing speed limits recognize that the majority of drivers behave in a safe and reasonable manner, and therefore, the normally careful and competent actions of a reasonable driver should be considered legal. Speed limits established on these fundamentals conform to the consensus that those who drive the highway determine what speed is reasonable and safe, not on the judgment of one or a few individuals. A radar speed study is usually used to record the prevailing speed of reasonable drivers.

Speed limits are also established to advise drivers of conditions which may not be readily apparent to a reasonable driver. For this reason, collision history, roadway conditions, traffic characteristics, and land use must also be analyzed before determining speed limits. Speed limit changes are usually made in coordination with physical changes in roadway conditions or roadside developments. Unusually short zones of less than one-half mile in length should be avoided to reduce driver confusion.

Additionally, it is generally accepted that speed limits cannot be successfully enforced without voluntary compliance by a majority of drivers. Consequently, only the driver whose behavior is clearly out of line with the normal flow of traffic is usually targeted for enforcement.

ELEMENTS OF THE ENGINEERING AND TRAFFIC SURVEY

The three basic elements of the Engineering and Traffic Survey are discussed in more detail below.

Speed Sampling

Existing vehicle speeds are surveyed by a certified radar operator with a calibrated radar unit in an unmarked vehicle. Speed samples are taken for each segment representing a statistically significant sample of current traffic. This data is then evaluated to identify the distribution of speeds. A key element in the evaluation is the identification of the 85th percentile speed. The 85th percentile speed is the speed at or below which 85 percent of the traffic travels. This threshold represents what is historically found to be a safe and reasonable speed for most drivers based on common roadway conditions. Therefore, a speed limit is established at the nearest 5-mile per hour (mph) increment to the 85th percentile speed, except as shown in the two options below from the MUTCD:

Option 1: The posted speed may be reduced by 5 mph from the nearest 5 mph increment of the 85th-percentile speed, in compliance with CVC Section 627 and 22358.5.

Option 2: For cases in which the nearest 5 mph increment of the 85th-percentile speed would require a rounding up, then the speed limit may be rounded down to the nearest 5 mph increment below the 85th percentile speed, if no further reduction is used. Refer to CVC Section 21400(b).

If the speed limit to be posted has had the 5 mph reduction applied, then an E&TS shall document in writing the conditions and justification for the lower speed limit. The reasons for the lower speed limit shall be in compliance with CVC Section 627 and 22358.5

The following examples are provided to explain the application of these speed limit criteria:

- A. Using Option 1 above and first step is to round down: If the 85th percentile speed in a speed survey for a location was 37 mph, then the speed limit would be established at 35 mph since it is the closest 5 mph increment to the 37 mph speed. As indicated by the option, this 35 mph established speed limit could be reduced by 5 mph to 30 mph if conditions and justification for using this lower speed limit are documented in the E&TS.
- B. Using Option 1 above and first step is to round up: If the 85th percentile speed in a speed survey for a location was 33 mph, then the speed limit would be established at 35 mph since it is the closest 5 mph increment to the 33 mph speed. As indicated by the option, this 35 mph speed limit could be reduced by 5 mph to 30 mph if the conditions and justification for using this lower speed limit are documented in the E&TS.
- C. Using Option 2 above and first step is to round up: If the 85th percentile speed in a speed survey for a location was 33 mph, instead of rounding up to 35 mph, the speed limit can be established at 30 mph, but no further reduction can be applied.

Conditions Not Readily Apparent to Motorists

Each street segment is field inspected to identify roadway conditions that may not be readily apparent to motorists. A determination is made whether any conditions are significant and warrant the recommendation of the speed limit 5 mph or more below the basic speed limit. It is important to note that the California MUTCD recommends exercising great care when establishing speed limits 5 mph or more below the basic speed limit.

SURVEY CONDITIONS

SURVEY LOCATIONS

The procedures described below describe the criteria and methods used to survey selected streets within the City of Hercules. The specific location of the radar speed survey for each street segment was selected after considering the following:

1. Minimum stop sign and traffic signal influence.
2. Minimum visibility restrictions.
3. Non-congested traffic flow away from intersections and driveways.
4. Minimum influence from curves or other roadway conditions that would affect the normal operation of a vehicle.

DATA COLLECTION

Data of existing conditions was obtained including prevailing speed of vehicles and general roadway conditions within the community. Field reviews were conducted between May and August 2017.

Speed Data

Speed measurements were conducted in May and August 2017. All surveys were conducted in good weather conditions on a typical weekday, with school still in session. The radar unit was operated from an unmarked vehicle to minimize any influence on driver behavior. Typically, a minimum sample size of 100 vehicles or the total samples during a maximum period of 2 hours were obtained for each segment. Traffic speeds in both directions were recorded for individual segments.

Field Review Data

In June 2017, a field review was conducted for each of the selected street segments in the City with consideration for the following factors:

1. Street width and alignment (design speed);
2. Pedestrian activity and traffic flow characteristics;
3. Number of lanes and other channelization and striping patterns;
4. Frequency of intersections, driveways, and on-street parking;
5. Location of stop signs and other regulatory traffic control devices;
6. Visibility obstructions;
7. Land use and proximity to schools;
8. Pedestrian and bicycle usage;
9. Uniformity with existing speed zones and those in adjacent jurisdictions; and
10. Any other unusual condition not readily apparent to the driver.

ANALYSIS

CRITERIA

Survey data was compiled and analyzed to determine the recommended speed limit in accordance with several criteria contained in The California Manual on Uniform Traffic Control Devices (CA MUTCD) dated November 2014. Some of the criteria used are:

- A. The critical speed or 85th percentile speed is that speed at or below which 85 percent of the traffic is moving. This speed is the baseline value in determining what the majority of drivers believe is safe and reasonable. Speed limits set higher than the critical speed are not considered reasonable and safe. Speed limits set lower than the critical speed make a large number of reasonable drivers "unlawful," and do not facilitate the orderly flow of traffic. The "basic speed limit" is the nearest 5 mph increment to the 85th percentile speed.
- B. The 10 mph pace speed is the 10 mph increment that contains the highest percentage of vehicles. It is a measure of the dispersion of speeds across the range of the samples surveyed. An accepted practice is to keep the speed limit within the 10 mph pace while considering the critical speed and other factors that might require a speed lower than the critical speed.
- C. When necessary, the collision rate for a street segment was compared to average collision rates that can be reasonably expected to occur on streets and highways in other jurisdictions, in proportion to the volume of traffic per lane mile. These average collision rates have been developed by the State of California and are considered reasonable for use in the City of Hercules.

RESULTS AND RECOMMENDATIONS

The Engineering and Traffic Survey Forms, presented in Appendix A, illustrate results of a thorough evaluation of the available data and recommend a speed limit for each street segment surveyed. A complete summary of all recommendations is shown in Table 2. In each case, the recommended speed limit was consistent with the prevailing behavior as demonstrated by the radar speed measurements. Typically, a speed limit in the upper range of the 10-mile pace was selected unless a collision rate significantly higher than expected was discovered or roadway conditions not readily apparent to the driver were identified. Any segments with recommended speed limits 5 mph or more below the basic speed limit are fully explained later in this report.

The Legislature, in adopting Section 22358.5 of the CVC, has made it clear that physical conditions, such as width, curvature, grade and surface conditions, or any other condition readily apparent to a driver, in the absence of other factors, would not be the basis for special downward speed zoning. In these cases, the basic speed law (CVC Section 22350) is sufficient to regulate such conditions.

The recommendations contained in this Report are intended to establish prima facie speed limits. They are not intended to be absolute for all prevailing conditions. All prima facie

speed violations are actually violations of the basic speed law (Section 22350 of California Vehicle Code). This statute states that a person shall not drive a vehicle at a speed greater than is safe having regard for traffic, roadway, and weather conditions. A prima facie limit is intended to establish a maximum safe speed under normal conditions.

Table 1 identifies the street segments with recommended changes in posted speed limits and Table 2 summarizes the recommendations for all surveyed segments. See Appendix A for the complete Engineering and Traffic Survey for the segments presented in Table 2.

**TABLE 1
STREET SEGMENTS WITH RECOMMENDED SPEED LIMIT CHANGES**

No	STREET	BETWEEN		EXISTING (MPH)	NEW (MPH)
6	Refugio Valley Rd.	Falcon Way- Redwood Road	Bonaire Avenue	40	35
10	Sycamore Avenue	Civic Drive	Palm Avenue	40	35

Table 2

Summary of Recommendations

No.	Street	Between	Critical Speed	Existing Limit	Recommended Speed Limit	Comments	
1	Alfred Nobel Drive	John Muir Parkway	End	40	35	35	MUTCD Option 2
2	Coronado Street	Refugio Valley Road	Carson Street	39	30	30	E&T not needed; ADT=977 vehicles
3	Linus Pauling Drive	San Pablo Avenue	West End	38	35	35	MUTCD Option 2
4	Refugio Valley Road	Sycamore Avenue	Partridge Drive	40	35	35	MUTCD Option 2
5	Refugio Valley Road	Partridge Drive	Falcon-Redwood	44	40	40	MUTCD Option 2; Posted Limit=25 when children are present
6	Refugio Valley Road	Falcon Way-Redwood	Bonaire Avenue	40	40	35	MUTCD Option 2; Posted Limit=35
7	San Pablo Avenue	Willow Avenue	Linus Pauling Drive	48	45	45	MUTCD Option 2
8	San Pablo Avenue	Linus Pauling Drive	Sycamore Avenue	49	45	45	MUTCD Option 2
9	San Pablo Avenue	Sycamore Avenue	South City Limit	50	45	45	MUTCD Option 2
10	Sycamore Avenue	Civic Drive	Palm Avenue	39	40	35	MUTCD Option 2
11	Sycamore Avenue	Palm Avenue	SR 4 Ramps	45	40	40	MUTCD Option 2
12	Turquoise Drive	Sycamore Avenue	Cinnabar Way	33	30	30	MUTCD Option 2
13	Willow Avenue	San Pablo Avenue	Canterbury Drive	42	40	40	Closest 5 mph increment
14	Willow Avenue	Canterbury Drive	Palm Avenue	38	40	40	Closest 5 mph increment
15	Willow Avenue	Palm Avenue	Sycamore Avenue	41	40	40	Closest 5 mph increment

LEGISLATIVE REFERENCES

APPLICABLE SECTIONS OF CALIFORNIA VEHICLE CODE

SECTION 1. Section 627 of the Vehicle Code:

Section 627.

- (a) *“Engineering and traffic survey,”* as used in this code, means a survey of highway and traffic conditions in accordance with methods determined by the Department of Transportation for use by state and local authorities.
- (b) An engineering and traffic survey shall include, among other requirements deemed necessary by the department, consideration of all of the following:
 - (1) Prevailing speeds as determined by traffic engineering measurements.
 - (2) Accident records.
 - (3) Highway, traffic, and roadside conditions not readily apparent to the driver.
- (c) When conducting an engineering and traffic survey, local authorities, in addition to the factors set forth in paragraphs (1) to (3), inclusive, of subdivision (b) may consider all of the following:
 - (1) Residential density, if any of the following conditions exist on the particular portion of highway and the property contiguous thereto, other than a business district:
 - a. Upon one side of the highway, within a distance of a quarter of a mile, the contiguous property fronting thereon is occupied by 13 or more separate dwelling houses or business structures.
 - b. Upon both sides of the highway, collectively, within a distance of a quarter of a mile, the contiguous property fronting thereon is occupied by 16 or more separate dwelling houses or business structures.
 - c. The portion of highway is longer than one-quarter of a mile but has the ratio of separate dwelling houses or business structures to the length of the highway described in either subparagraph (A) or (B).
 - (2) Pedestrian and bicyclist safety.

Basic Speed Law

22350. No person shall drive a vehicle upon a highway at a speed greater than is reasonable or prudent having due regard for weather, visibility, the traffic on, and the surface and width of, the highway, and in no event at a speed which endangers the safety of persons or property.

Speed Law Violations

Section 22351.

- (a) The speed of any vehicle upon a highway not in excess of the limits specified in Section 22352 or established as authorized in this code is lawful unless clearly proved to be in violation of the basic speed law.
- (b) The speed of any vehicle upon a highway in excess of the prima facie speed limits in Section 22352 or established as authorized in this code is prima facie unlawful unless the defendant

establishes by competent evidence that the speed in excess of said limits did not constitute a violation of the basic speed law at the time, place and under the conditions then existing.

Prima Facie Speed Limits

Section 22352.

The prima facie limits are as follows and shall be applicable unless changed as authorized in this code and, if so changed, only when signs have been erected giving notice thereof:

(a) Fifteen miles per hour:

(1) When traversing a railway grade crossing, if during the last 100 feet of the approach to the crossing the driver does not have a clear and unobstructed view of the crossing and of any traffic on the railway for a distance of 400 feet in both directions along such railway. This subdivision does not apply in the case of any railway grade crossing where a human flagman is on duty or a clearly visible electrical or mechanical railway crossing signal device is installed but does not then indicate the immediate approach of a railway train or car.

(2) When traversing any intersection of highways, if during the last 100 feet of the driver's approach to the intersection, the driver does not have a clear and unobstructed view of the intersection and of any traffic upon all of the highways entering the intersection for a distance of 100 feet along all those highways, except at an intersection protected by stop signs or yield right-of-way signs or controlled by official traffic control signals.

(3) On any alley.

(b) Twenty-five miles per hour:

(1) On any highway other than a state highway, in any business or residence district unless a different speed is determined by local authority under procedures set forth in this code.

(2) When approaching or passing a school building or the grounds thereof, contiguous to a highway and posted with a standard "SCHOOL" warning sign, while children are going to or leaving the school either during school hours or during the noon recess period. The prima facie limit shall also apply when approaching or passing any school grounds which are not separated from the highway by a fence, gate or other physical barrier while the grounds are in use by children and the highway is posted with a standard "SCHOOL" warning sign. For purposes of this subparagraph, standard "SCHOOL" warning signs may be placed at any distance up to 500 feet away from school grounds.

(3) When passing a senior center or other facility primarily used by senior citizens, contiguous to a street other than a state highway and posted with a standard "SENIOR" warning sign. A local authority may erect a sign pursuant to this paragraph when the local agency makes a determination that the proposed signing should be implemented. A local authority may request grant funding from the Pedestrian Safety Account pursuant to Section 894.7 of the Streets and Highways Code, or any other grant funding available to it, and use that grant funding to pay for the erection of those signs, or may utilize any other funds available to it to pay for the erection of those signs, including, but not limited to, donations from private sources.

Increase of Local Speed Limits to 65 Miles Per Hour

Section 22357.

- (a) Whenever a local authority determines upon the basis of an engineering and traffic survey that a speed greater than 25 miles per hour would facilitate the orderly movement of vehicular traffic and would be reasonable and safe upon any street other than a state highway otherwise subject to a prima facie limit of 25 miles per hour, the local authority may by ordinance determine and declare a prima facie speed limit of 30, 35, 40, 45, 50, 55 or 60 miles per hour or a maximum speed limit of 65 miles per hour, whichever is found most appropriate to facilitate the orderly movement of traffic and is reasonable and safe. The declared prima facie or maximum speed limit shall be effective when appropriate signs giving notice thereof are erected upon the street and shall not thereafter be revised except upon the basis of an engineering and traffic survey. This section does not apply to any 25 mile per hour prima facie limit, which is applicable when passing a school building or the grounds thereof or when passing a senior center or other facility primarily used by senior citizens.
- (b) This section shall become operative on the date specified in subdivision (c) of Section 22366.

Downward Speed Zoning

Section 22358.5.

It is the intent of the Legislature that physical conditions such as width, curvature, grade and surface conditions, or any other condition readily apparent to a driver, in the absence of other factors, would not require special downward speed zoning, as the basic rule of Section 22350 is sufficient regulation as to such conditions.

Boundary Line Streets

Section 22359.

With respect to boundary line streets and highways where portions thereof are within different jurisdictions, no ordinance adopted under Sections 22357 and 22358 shall be effective as to any such portion until all authorities having jurisdiction of the portions of the street concerned have approved the same. This section shall not apply in the case of boundary line streets consisting of separate roadways within different jurisdictions.

Speed Trap Prohibition

Section 40801.

No peace officer or other person shall use a speedtrap in arresting, or participating or assisting in the arrest of, any person for any alleged violation of this code nor shall any speed trap be used in securing evidence as to the speed of any vehicle for the purpose of an arrest or prosecution under this code.

Speed Trap

Section 40802.

- (a) A "speed trap" is either of the following:
- (1) A particular section of a highway measured as to distance and with boundaries marked, designated, or otherwise determined in order that the speed of a vehicle may be calculated by securing the time it takes the vehicle to travel the known distance.
 - (2) A particular section of a highway with a prima facie speed limit that is provided by this code or by local ordinance under subparagraph (A) of paragraph (2) of subdivision (a) of Section 22352, or established under Section 22354, 22357, 22358, or 22358.3, if that prima facie speed limit is not justified by an engineering and traffic survey conducted within five years prior to the date of the alleged violation, and enforcement of the speed limit involves the use of radar or any other electronic device that measures the speed of moving object. This paragraph does not apply to a local street, road, or school zone.
- (b)(1) For purposes of this section, a local street or road is one that is functionally classified as "local" on the "California Road System Maps," that are approved by the Federal Highway Administration and maintained by the Department of Transportation. When a street or road does not appear on the "California Road System Maps," (see Appendix C) it may be defined as a "local street or road" if it primarily provides access to abutting residential property and meets the following three conditions:
- (A) Roadway width of not more than 40 feet.
 - (B) Not more than one-half of a mile of uninterrupted length. Interruptions shall include official traffic control signals as defined in Section 445.
 - (C) Not more than one traffic lane in each direction.
- (2) For purposes of this section "school zone" means that area approaching or passing a school building or the grounds thereof that is contiguous to a highway and on which is posted a standard "SCHOOL" warning sign, while children are going to or leaving the school either during school hours or during the noon recess period. "School zone" also includes the area approaching or passing any school grounds that are not separated from the highway by a fence, gate, or other physical barrier while the grounds are in use by children if that highway is posted with a standard "SCHOOL" warning sign.
- (c)(1) When all the following criteria are met, paragraph (2) of this subdivision shall be applicable and subdivision (a) shall not be applicable:
- (A) When radar is used, the arresting officer has successfully completed a radar operator course of not less than 24 hours on the use of police traffic radar, and the course was approved and certified by the Commission on Peace Officer Standards and Training.
 - (B) When laser or any other electronic device is used to measure the speed of moving objects, the arresting officer has successfully completed the training required in subparagraph (A) and an additional training course of not less than two hours approved and certified by the Commission on Peace Officer Standards and Training.

- (C)(i) The prosecution proved that the arresting officer complied with subparagraphs (A) and (B) and that an engineering and traffic survey has been conducted in accordance with subparagraph (B) of paragraph (2). The prosecution proved that, prior to the officer issuing the notice to appear, the arresting officer established that the radar, laser, or other electronic device conformed to the requirements of subparagraph (D).
 - (ii) The prosecution proved the speed of the accused was unsafe for the conditions present at the time of alleged violation unless the citation was for a violation of Section 22349, 22356, or 22406.
 - (D) The radar, laser, or other electronic device used to measure the speed of the accused meets or exceeds the minimal operational standards of the National Traffic Highway Safety Administration, and has been calibrated within the three years prior to the date of the alleged violation by an independent certified laser or radar repair and testing or calibration facility.
- (2) A “speed trap” is either of the following:
- (A) A particular section of a highway measured as to distance and with boundaries marked, designated, or otherwise determined in order that the speed of a vehicle may be calculated by securing the time it takes the vehicle to travel the known distance.
 - (B)(i) A particular section of a highway or state highway with a prima facie speed limit that is provided by this code or by local ordinance under subparagraph (A) of paragraph (2) of subdivision (a) of Section 22352, or established under Section 22354, 22357, 22358, or 22358.3, if that prima facie speed limit is not justified by an engineering and traffic survey conducted within one of the following time periods, prior to the date of the alleged violation, and enforcement of speed limit involves the use of radar or any other electronic device that measures the speed of moving objects:
 - (I) Except as specified in subclause (II), seven years.
 - (II) If an engineering and traffic survey was conducted more than seven years prior to the date of the alleged violation, and a registered engineer evaluates the section of the highway and determines that no significant changes in roadway or traffic conditions have occurred including, but not limited to, changes in adjoining property or land use, roadway width, or traffic volume, 10 years.
 - (ii) This subparagraph does not apply to a local street, road, or school zone.

Speed Trap Evidence

Section 40803.

- (a) No evidence as to the speed of a vehicle upon a highway shall be admitted in any court upon the trial of any person in any prosecution under this code upon a charge involving the speed of a vehicle when the evidence is based upon or obtained from or by the maintenance or use of a speedtrap.

- (b) In any prosecution under this code of a charge involving the speed of a vehicle, where enforcement involves the use of radar or other electronic devices which measure the speed of moving objects, the prosecution shall establish, as part of its prima facie case, that the evidence or testimony presented is not based upon a speed trap as defined in paragraph (2) of subdivision (a) of Section 40802.
- (c) When a traffic and engineering survey is required pursuant to paragraph (2) of subdivision (a) of Section 40802, evidence that a traffic and engineering survey has been conducted within five years of the date of the alleged violation or evidence that the offense was committed on a local street or road as defined in paragraph (2) of subdivision (a) of Section 40802 shall constitute a prima facie case that the evidence or testimony is not based upon a speed trap as defined in paragraph (2) subdivision (a) of Section 40802.

APPENDIX A

Engineering and Traffic Surveys

1

CITY OF HERCULES
ENGINEERING AND TRAFFIC SURVEY

STREET Alfred Nobel Drive
FROM John Muir Parkway

CERTIFICATION DATE
TO End

SPEED FACTORS

Date of Speed Survey	5/17/2017	Posted Speed Limit	35 mph
Time of Speed Survey	2p-330p	Speed Justification	
50th Percentile Speed (Mean Speed)	35 mph	MUTCD Option 2	
85th Percentile Speed	40 mph		
Average Speed	0 mph		
10 mph Pace Speed	30-39		
Percentage of Vehicles in Pace	71	Recommended Speed Limit	35 mph
Number of Survey Samples	116		

COLLISION HISTORY

Number of Years Studied	years
Total Collisions	
Statewide Average Collision Rate	Collisions/MVM
Collisions per Million Vehicle Miles	Collisions/MVM

TRAFFIC FACTORS

Average Daily Traffic	2,425	Date Counted	6/7/2012
Number of Lanes	2		
Type of Traffic Control	Stop at Linus Pauling and John Muir		
Crosswalks?	No		
Pedestrian Traffic	Light		
Truck Traffic	Light		
On-Street Parking	No		
Sidewalks?	Yes		
Driveways?	Yes		

ROADWAY FACTORS

Length of Segment	0.600 miles
Width	46 feet
Vertical Curve?	Yes
Horizontal Curve?	Yes
Visibility	Good
Roadway Conditions	Good
Lighting	Yes
Adjacent Land Use	Office

Field Study By GL

Checked By

CERTIFICATION: I, Gordon Lum, do hereby certify that this Engineering and Traffic Survey within the City of Hercules was performed under my supervision and is accurate and complete. I am duly registered in the State of California as a Professional Engineer (Traffic).


Gordon Lum

12/4/17

Date

TE 1542

State Registration Number

Spot Speed Study

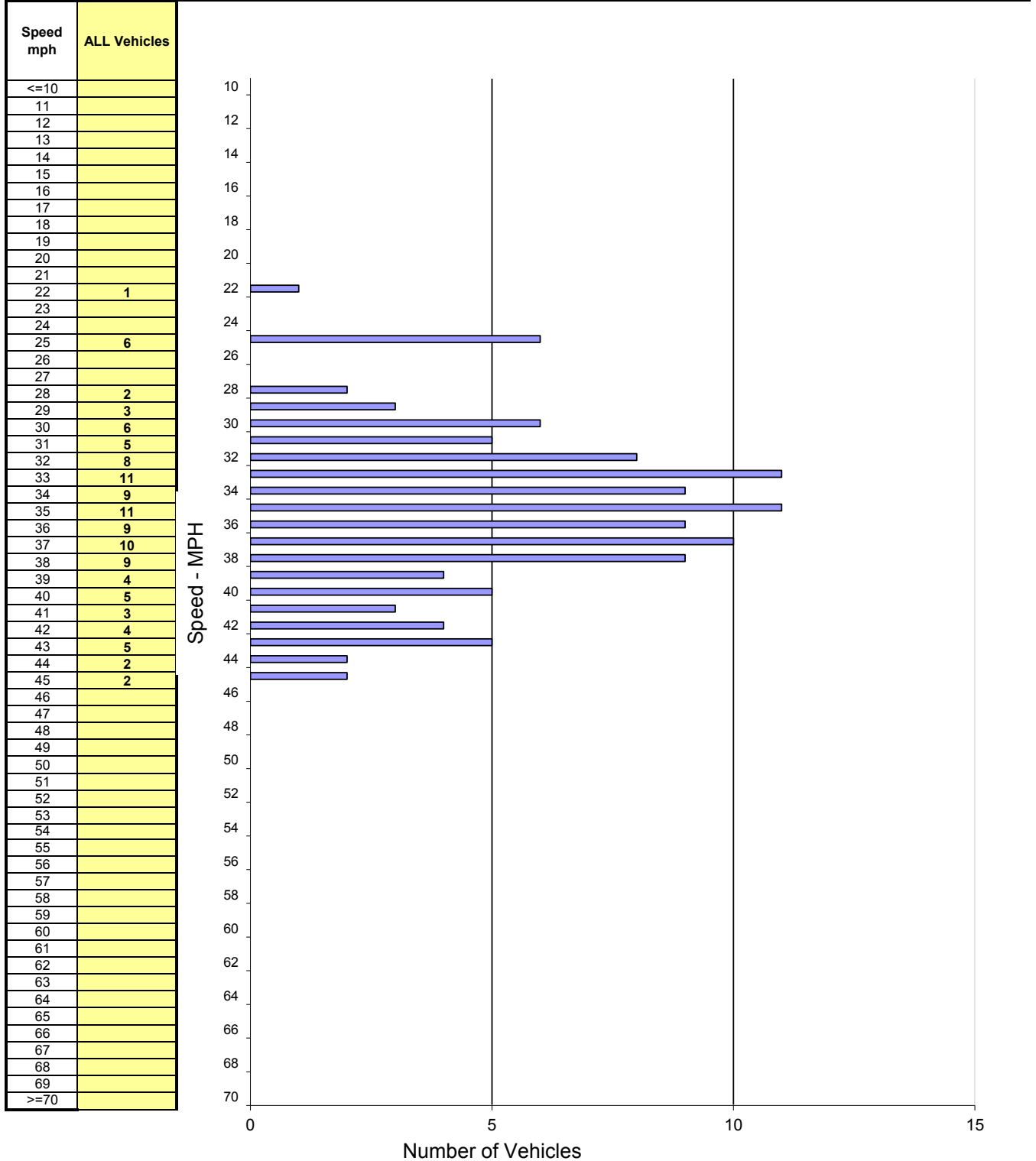
Prepared by: National Data & Surveying Services

City of Hercules

DATE: 5/17/2017
TIME: 13:45-15:15

Location: Alfred Nobel Dr Bet. John Muir Pkwy & Linus Pauling Dr
Posted Speed: 35 MPH Sunny Project #: 17-7448-001

Northbound & Southbound Spot Speeds



SPEED PARAMETERS									
Class	Count	Range	50th Percentile	85th Percentile	10 MPH Pace	# in Pace	Percent in Pace	% / # Below Pace	% / # Above Pace
ALL	115	22 - 45	35 mph	40 mph	30 - 39	82	71%	10% / 12	19% / 21

CITY OF HERCULES ENGINEERING AND TRAFFIC SURVEY

3

STREET Linus Pauling Drive
FROM West End

CERTIFICATION DATE
TO San Pablo Avenue

SPEED FACTORS

Date of Speed Survey	5/25/2017	Posted Speed Limit	35 mph
Time of Speed Survey	24 hour	Speed Justification	
50th Percentile Speed (Mean Speed)	32 mph	MUTCD Option 2	
85th Percentile Speed	38 mph		
Average Speed	31 mph		
10 mph Pace Speed			
Percentage of Vehicles in Pace		Recommended Speed Limit	35 mph
Number of Survey Samples	2600		

COLLISION HISTORY

Number of Years Studied	0	years
Total Collisions		
Statewide Average Collision Rate		Collisions/MVM
Collisions per Million Vehicle Miles		Collisions/MVM

TRAFFIC FACTORS

Average Daily Traffic	2,600	Date Counted	5/25/2017
Number of Lanes	2		
Type of Traffic Control	Stop at San Pablo, Alfred Noble		
Crosswalks?	At San Pablo		
Pedestrian Traffic	Light		
Truck Traffic	Light		
On-Street Parking	No		
Sidewalks?	Yes		
Driveways?	Yes		

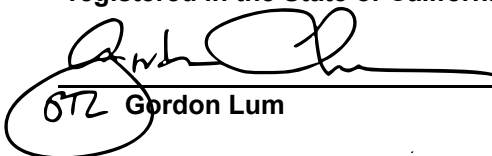
ROADWAY FACTORS

Length of Segment	0.620	miles
Width	50	feet
Vertical Curve?	No	
Horizontal Curve?	Yes	
Visibility	Good	
Roadway Conditions	Good	
Lighting	Yes	
Adjacent Land Use	Office	

Field Study By GL

Checked By

CERTIFICATION: I, Gordon Lum, do hereby certify that this Engineering and Traffic Survey within the City of Hercules was performed under my supervision and is accurate and complete. I am duly registered in the State of California as a Professional Engineer (Traffic).


672 Gordon Lum

12/4/17

Date

TE 1542

State Registration Number

SPEED

Linus Pauling Dr Bet. San Pablo Ave & Alfred Nobel Dr

Day: Thursday
Date: 5/25/2017

City: Hercules
Project #: CA17_7449_015e

East Bound

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
0:00 AM	0	0	1	1	2	1	0	0	0	0	0	0	0	5
1:00	0	0	1	1	0	0	1	0	0	0	0	0	0	3
2:00	0	0	0	2	0	0	0	0	0	0	0	0	0	2
3:00	0	0	0	1	1	1	0	0	0	0	0	0	0	3
4:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1
5:00	0	0	2	1	2	1	0	0	0	0	0	0	0	6
6:00	0	0	3	5	3	2	1	0	0	0	0	0	0	14
7:00	0	0	5	3	4	3	1	0	0	0	0	0	0	16
8:00	1	0	10	9	6	7	2	0	0	0	0	0	0	35
9:00	0	1	3	11	6	7	1	0	0	0	0	0	0	29
10:00	1	4	6	13	10	5	4	1	0	0	0	0	0	44
11:00	0	2	15	29	51	20	5	1	0	0	0	0	0	123
12:00 PM	0	5	16	48	47	22	2	0	0	0	0	0	0	140
13:00	0	3	3	15	29	13	4	0	0	0	0	0	0	67
14:00	1	0	9	25	34	19	3	0	0	0	0	0	0	91
15:00	0	2	12	24	34	18	4	0	0	0	0	0	0	94
16:00	1	0	8	62	90	46	12	0	0	0	0	0	0	219
17:00	0	0	22	74	105	33	19	2	0	0	0	0	0	255
18:00	0	0	4	24	27	19	10	1	0	0	0	0	0	85
19:00	0	0	2	5	10	11	6	0	0	0	0	0	0	34
20:00	0	0	1	4	7	4	2	0	0	0	0	0	0	18
21:00	0	0	2	2	3	2	1	0	0	0	0	0	0	10
22:00	0	0	0	1	2	1	0	0	0	0	0	0	0	4
23:00	1	0	1	1	0	2	0	1	0	0	0	0	0	6
Totals	5	17	126	361	474	237	78	6						1304
% of Totals	0%	1%	10%	28%	36%	18%	6%	0%						100%

AM Volumes	2	7	46	76	86	47	15	2	0	0	0	0	0	281		
% AM	0%	1%	4%	6%	7%	4%	1%	0%						22%		
AM Peak Hour	8:00	10:00	11:00	11:00	11:00	11:00	11:00	10:00						11:00		
Volume	1	4	15	29	51	20	5	1						123		
PM Volumes	3	10	80	285	388	190	63	4	0	0	0	0	0	1023		
% PM	0%	1%	6%	22%	30%	15%	5%	0%						78%		
PM Peak Hour	14:00	12:00	17:00	17:00	17:00	16:00	17:00	17:00						17:00		
Volume	1	5	22	74	105	46	19	2						255		
Directional Peak Periods All Speeds		AM 7-9				NOON 12-2				PM 4-6				Off Peak Volumes		
		Volume	↔		%	Volume	↔		%	Volume	↔		%	Volume	↔	
		51			4%	207			16%	474			36%	572		

Street Name	Direction	Percentiles					
		15th	50th	Average	85th	95th	ADT
Linus Pauling Dr	East Bound	26	32	31	38	41	1304
Linus Pauling Dr	West Bound	27	33	32	38	40	1296

CITY OF HERCULES
ENGINEERING AND TRAFFIC SURVEY

4

STREET Refugio Valley Road
FROM Sycamore Avenue

CERTIFICATION DATE
TO Partridge Drive

SPEED FACTORS

Date of Speed Survey	5/19/2017	Posted Speed Limit	35 mph
Time of Speed Survey	2p-315	Speed Justification	
50th Percentile Speed (Mean Speed)	37 mph	MUTCD Option 2	
85th Percentile Speed	40 mph		
Average Speed	mph		
10 mph Pace Speed	33-42		
Percentage of Vehicles in Pace	91	Recommended Speed Limit	35 mph
Number of Survey Samples	220		

COLLISION HISTORY

Number of Years Studied	years
Total Collisions	
Statewide Average Collision Rate	Collisions/MVM
Collisions per Million Vehicle Miles	Collisions/MVM

TRAFFIC FACTORS

Average Daily Traffic	16,732	Date Counted	5/31/2012
Number of Lanes	2		
Type of Traffic Control	Signal at Sycamore, Pheasant, Partridge		
Crosswalks?	At Sycamore, Pheasant, Partridge		
Pedestrian Traffic	Moderate		
Truck Traffic	Light		
On-Street Parking	No		
Sidewalks?	Yes		
Driveways?	No		

ROADWAY FACTORS

Length of Segment	0.600 miles
Width	56 feet
Vertical Curve?	Yes
Horizontal Curve?	Yes
Visibility	Good
Roadway Conditions	Good
Lighting	Yes
Adjacent Land Use	Lake, tennis club, fields

Field Study By GL

Checked By

CERTIFICATION: I, Gordon Lum, do hereby certify that this Engineering and Traffic Survey within the City of Hercules was performed under my supervision and is accurate and complete. I am duly registered in the State of California as a Professional Engineer (Traffic).


Gordon Lum

12/4/17

Date

TE 1542

State Registration Number

Spot Speed Study

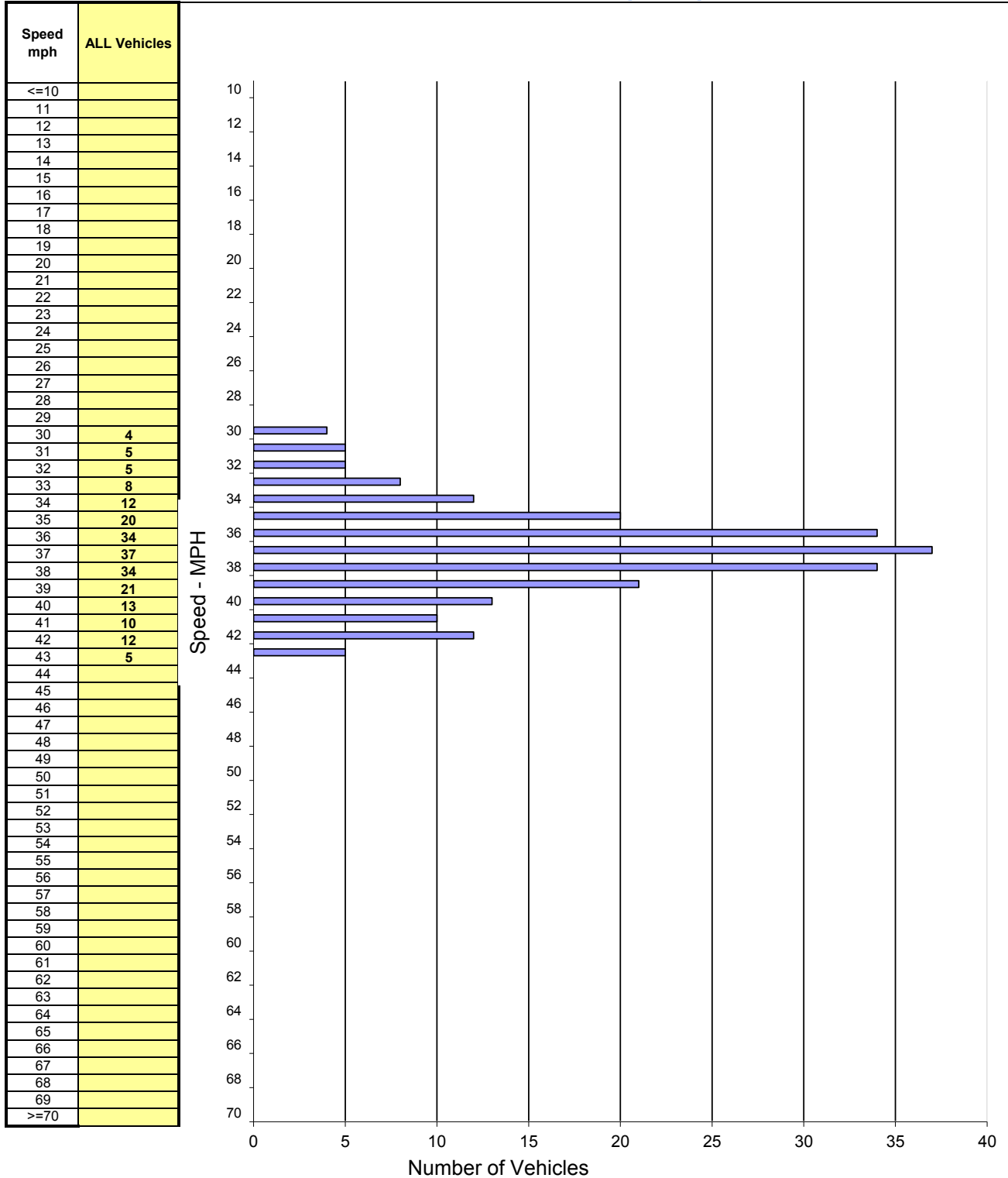
Prepared by: National Data & Surveying Services

City of Hercules

DATE: 5/19/2017
TIME: 14:15-15:15

Location: Refugio Valley Rd Bet. Sycamore Ave & Partridge Dr
Posted Speed: 35 MPH Clear/Dry Project #: 17-7448-009

Northbound & Southbound Spot Speeds



SPEED PARAMETERS									
Class	Count	Range	50th Percentile	85th Percentile	10 MPH Pace	# in Pace	Percent in Pace	% / # Below Pace	% / # Above Pace
ALL	220	30 - 43	37 mph	40 mph	33 - 42	201	91%	6% / 14	3% / 5

CITY OF HERCULES ENGINEERING AND TRAFFIC SURVEY

5

STREET Refugio Valley Road
FROM Partridge Drive

CERTIFICATION DATE
TO Falcon Way

SPEED FACTORS

Date of Speed Survey	5/17/2017	Posted Speed Limit	25* mph
Time of Speed Survey	920-10a	Speed Justification	
50th Percentile Speed (Mean Speed)	41 mph	MUTCD Option 2. *=25 mph speed	
85th Percentile Speed	44 mph	limit is when children are present	
Average Speed	0 mph		
10 mph Pace Speed	36-45		
Percentage of Vehicles in Pace		Recommended Speed Limit	40 mph
Number of Survey Samples	133		

COLLISION HISTORY

Number of Years Studied	0	years	
Total Collisions			
Statewide Average Collision Rate		Collisions/MVM	
Collisions per Million Vehicle Miles		Collisions/MVM	

TRAFFIC FACTORS

Average Daily Traffic	9,221	Date Counted	5/31/2012
Number of Lanes	2		
Type of Traffic Control	Signal at Schools, Community Ctr;		
Crosswalks?	At Schools and Community Center		
Pedestrian Traffic	Moderate		
Truck Traffic	Light		
On-Street Parking	No		
Sidewalks?	Yes		
Driveways?	No		

ROADWAY FACTORS

Length of Segment	0.890	miles
Width	50	feet
Vertical Curve?	Yes	
Horizontal Curve?	Yes	
Visibility	Good	
Roadway Conditions	Good	
Lighting	Yes	
Adjacent Land Use	Middle-High Schools	

Field Study By GL

Checked By

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12/4/17

TE 1542


Gordon Lum

Date

State Registration Number

Spot Speed Study

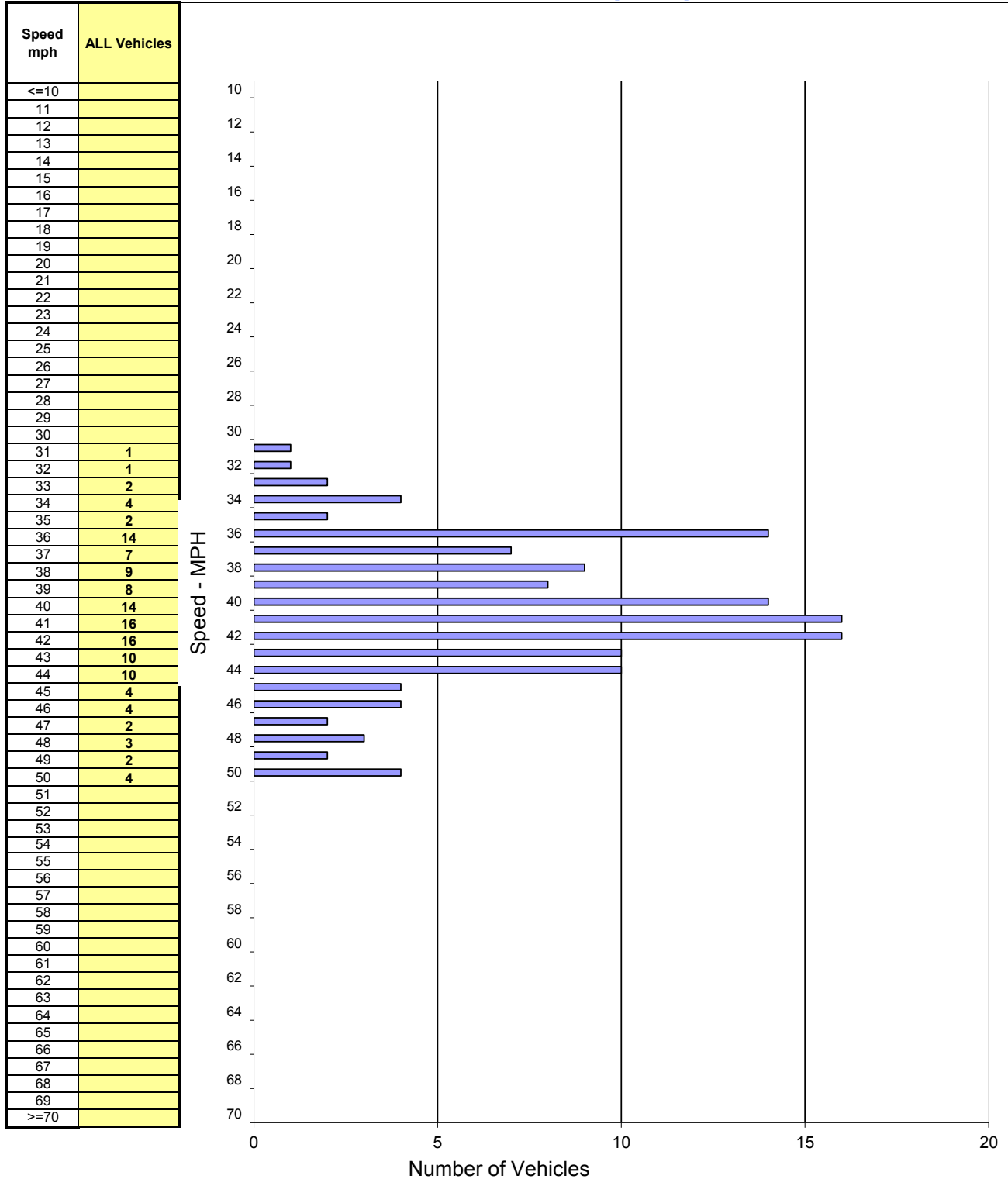
Prepared by: National Data & Surveying Services

City of Hercules

DATE: 5/17/2017
TIME: 09:20-10:00

Location: Refugio Valley Rd Bet. Partridge Dr & Falcon Way
Posted Speed: 25 (WCAP) Sunny Project #: 17-7448-010

Eastbound & Westbound Spot Speeds



SPEED PARAMETERS									
Class	Count	Range	50th Percentile	85th Percentile	10 MPH Pace	# in Pace	Percent in Pace	% / # Below Pace	% / # Above Pace
ALL	133	31 - 50	41 mph	44 mph	36 - 45	108	81%	7% / 10	12% / 15

CITY OF HERCULES ENGINEERING AND TRAFFIC SURVEY

6

STREET Refugio Valley Road **CERTIFICATION DATE**
FROM Falcon Way-Redwood Road **TO** Bonaire Avenue

SPEED FACTORS

Date of Speed Survey	5/19/2017	Posted Speed Limit	35 mph
Time of Speed Survey	320-4p	Speed Justification	
50th Percentile Speed (Mean Speed)	37 mph	MUTCD Option 2	
85th Percentile Speed	40 mph		
Average Speed	mph		
10 mph Pace Speed	33-42		
Percentage of Vehicles in Pace	91	Recommended Speed Limit	35 mph
Number of Survey Samples	258		

COLLISION HISTORY

Number of Years Studied	5	years
Total Collisions	0	
Statewide Average Collision Rate	2.04	Collisions/MVM
Collisions per Million Vehicle Miles	0.000	Collisions/MVM

TRAFFIC FACTORS

Average Daily Traffic	3,828	Date Counted	5/31/2012
Number of Lanes	2		
Type of Traffic Control	Stop at Carson		
Crosswalks?	Carson, Malibu, Midshp, Southwnd, Corondo, mid-block		
Pedestrian Traffic	Light		
Truck Traffic	Light		
On-Street Parking	No		
Sidewalks?	Yes		
Driveways?	No		

ROADWAY FACTORS

Length of Segment	0.980	miles
Width	40	feet
Vertical Curve?	Yes	
Horizontal Curve?	Yes	
Visibility	Good	
Roadway Conditions	Good	
Lighting	Yes	
Adjacent Land Use	Residential	

Field Study By GL

Checked By

CERTIFICATION: I, Gordon Lum, do hereby certify that this Engineering and Traffic Survey within the City of Hercules was performed under my supervision and is accurate and complete. I am duly registered in the State of California as a Professional Engineer (Traffic).

12/4/17

TE 1542

GTZ Gordon Lum

Date

State Registration Number

Spot Speed Study

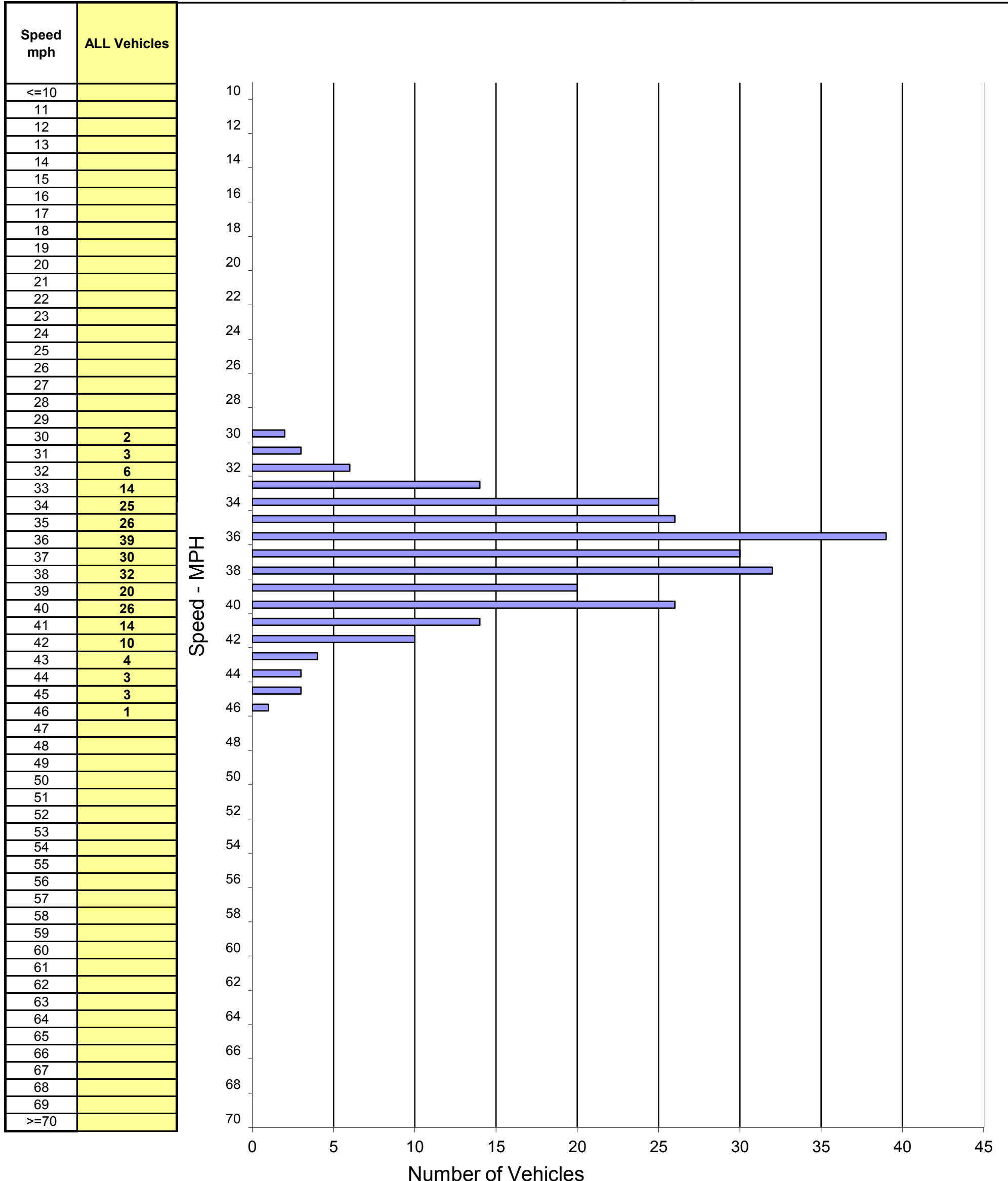
Prepared by: National Data & Surveying Services

City of Hercules

DATE: 5/19/2017
TIME: 15:20-16:00

Location: Refugio Valley Rd Bet. Falcon Way & Bonair Ave
Posted Speed: 35 MPH Clear/Dry Project #: 17-7448-011

Northbound & Southbound Spot Speeds



SPEED PARAMETERS									
Class	Count	Range	50th Percentile	85th Percentile	10 MPH Pace	# in Pace	Percent in Pace	% / # Below Pace	% / # Above Pace
ALL	258	30 - 46	37 mph	40 mph	33 - 42	236	91%	4% / 11	5% / 11

CITY OF HERCULES
ENGINEERING AND TRAFFIC SURVEY

7

STREET San Pablo Avenue
FROM Willow Avenue

CERTIFICATION DATE
TO Linus Pauling Drive

SPEED FACTORS

Date of Speed Survey	5/17/2017	Posted Speed Limit	45 mph
Time of Speed Survey	250-4p	Speed Justification	
50th Percentile Speed (Mean Speed)	43 mph	MUTCD Option 2	
85th Percentile Speed	48 mph		
Average Speed	mph		
10 mph Pace Speed	39-48		
Percentage of Vehicles in Pace	77	Recommended Speed Limit	45 mph
Number of Survey Samples	247		

COLLISION HISTORY

Number of Years Studied	0	years
Total Collisions		
Statewide Average Collision Rate		Collisions/MVM
Collisions per Million Vehicle Miles		Collisions/MVM

TRAFFIC FACTORS

Average Daily Traffic	10,945	Date Counted	6/7/2012
Number of Lanes	4		
Type of Traffic Control	Signal: Victoria Crescent, Willow		
Crosswalks?	At Victoria Crescent and Willow		
Pedestrian Traffic	Light		
Truck Traffic	Light		
On-Street Parking	Yes		
Sidewalks?	Yes		
Driveways?	No		

ROADWAY FACTORS

Length of Segment	0.500	miles
Width	82	feet
Vertical Curve?	No	
Horizontal Curve?	No	
Visibility	Good	
Roadway Conditions	Good	
Lighting	Yes	
Adjacent Land Use	Residential backyards	

Field Study By GL

Checked By

CERTIFICATION: I, Gordon Lum, do hereby certify that this Engineering and Traffic Survey within the City of Hercules was performed under my supervision and is accurate and complete. I am duly registered in the State of California as a Professional Engineer (Traffic).

12/4/17

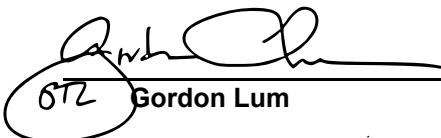
TE 1542

State Registration Number

Date

Gordon Lum

GTZ



Spot Speed Study

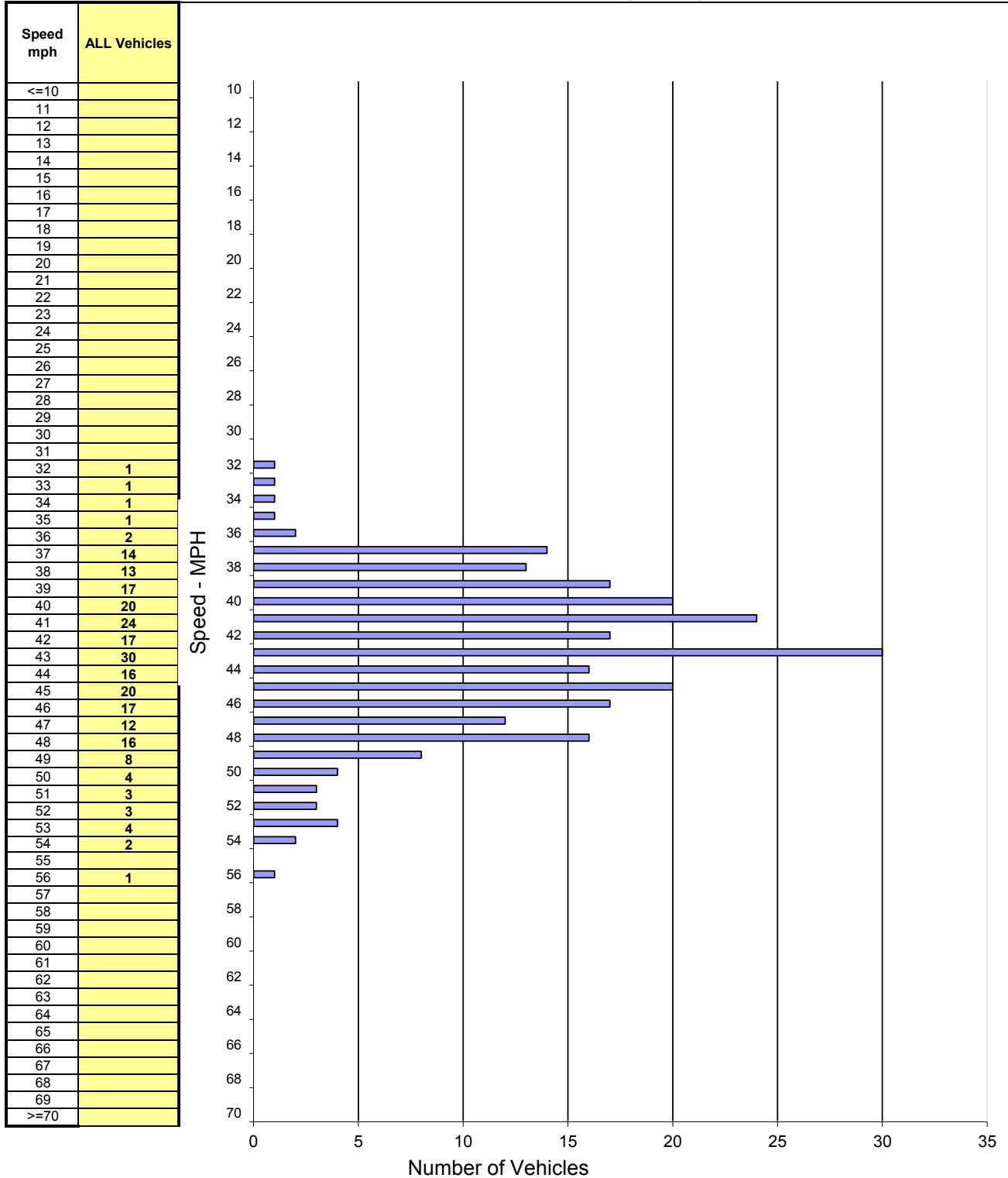
Prepared by: National Data & Surveying Services

City of Hercules

DATE: 5/17/2017
TIME: 14:50-15:50

Location: San Pablo Ave Bet. Willow Ave & Linus Pauling Dr
Posted Speed: 40 MPH Sunny Project #: 17-7448-012

Northbound & Southbound Spot Speeds



SPEED PARAMETERS									
Class	Count	Range	50th Percentile	85th Percentile	10 MPH Pace	# in Pace	Percent in Pace	% / # Below Pace	% / # Above Pace
ALL	247	32 - 56	43 mph	48 mph	39 - 48	189	77%	13% / 33	11% / 25

CITY OF HERCULES
ENGINEERING AND TRAFFIC SURVEY

8

STREET San Pablo Avenue
FROM Linus Pauling Drive

CERTIFICATION DATE
TO Sycamore Avenue

SPEED FACTORS

Date of Speed Survey	5/19/2017	Posted Speed Limit	45 mph
Time of Speed Survey	1p-210	Speed Justification	
50th Percentile Speed (Mean Speed)	45 mph	MUTCD Option 2	
85th Percentile Speed	49 mph		
Average Speed	mph		
10 mph Pace Speed	40-49		
Percentage of Vehicles in Pace	75	Recommended Speed Limit	45 mph
Number of Survey Samples	254		

COLLISION HISTORY

Number of Years Studied	0	years
Total Collisions		
Statewide Average Collision Rate		Collisions/MVM
Collisions per Million Vehicle Miles		Collisions/MVM

TRAFFIC FACTORS

Average Daily Traffic	12,234	Date Counted	6/7/2012
Number of Lanes	4		
Type of Traffic Control	Signal at John Muir, Sycamore, Market Drive		
Crosswalks?	AT John Muir, Sycamore		
Pedestrian Traffic	Light		
Truck Traffic	Light		
On-Street Parking	No		
Sidewalks?	Yes		
Driveways?	No		

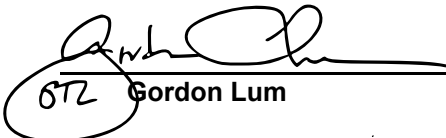
ROADWAY FACTORS

Length of Segment	0.550	miles
Width	98	feet
Vertical Curve?	No	
Horizontal Curve?	No	
Visibility	Good	
Roadway Conditions	Good	
Lighting	Good	
Adjacent Land Use	Open space	

Field Study By GL

Checked By

CERTIFICATION: I, Gordon Lum, do hereby certify that this Engineering and Traffic Survey within the City of Hercules was performed under my supervision and is accurate and complete. I am duly registered in the State of California as a Professional Engineer (Traffic).


072 Gordon Lum

12/4/17

Date

TE 1542

State Registration Number

Spot Speed Study

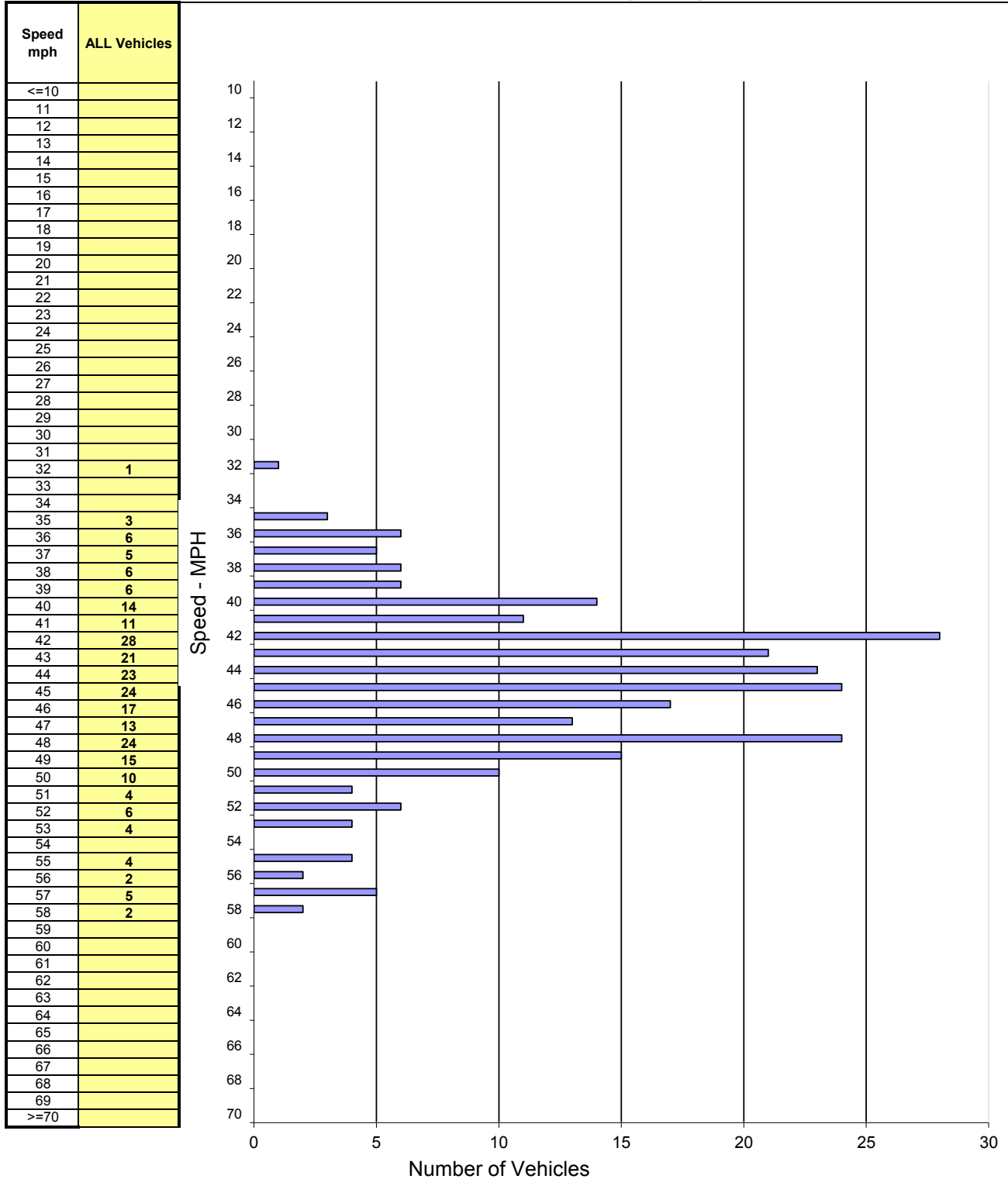
Prepared by: National Data & Surveying Services

City of Hercules

DATE: 5/19/2017
TIME: 13:10-14:10

Location: San Pablo Ave Bet. Linus Pauling Dr & Sycamore Ave
Posted Speed: 40 MPH Clear/Dry Project #: 17-7448-013

Northbound & Southbound Spot Speeds



SPEED PARAMETERS									
Class	Count	Range	50th Percentile	85th Percentile	10 MPH Pace	# in Pace	Percent in Pace	% / # Below Pace	% / # Above Pace
ALL	254	32 - 58	45 mph	49 mph	40 - 49	190	75%	10% / 27	15% / 37

CITY OF HERCULES
ENGINEERING AND TRAFFIC SURVEY

9

STREET San Pablo Avenue
FROM Sycamore Avenue

CERTIFICATION DATE
TO South City Limit

SPEED FACTORS

Date of Speed Survey	5/17/2017	Posted Speed Limit	45 mph
Time of Speed Survey	405-5p	Speed Justification	
50th Percentile Speed (Mean Speed)	45 mph	MUTCD Option 2	
85th Percentile Speed	50 mph		
Average Speed	mph		
10 mph Pace Speed	38-47		
Percentage of Vehicles in Pace	71	Recommended Speed Limit	45 mph
Number of Survey Samples	252		

COLLISION HISTORY

Number of Years Studied	0	years
Total Collisions		
Statewide Average Collision Rate		Collisions/MVM
Collisions per Million Vehicle Miles		Collisions/MVM

TRAFFIC FACTORS

Average Daily Traffic	15,245	Date Counted	6/21/2012
Number of Lanes	4		
Type of Traffic Control	Signal at Hercules, Sycamore		
Crosswalks?	At Hercules, Sycamore		
Pedestrian Traffic	Light		
Truck Traffic	Light		
On-Street Parking	No		
Sidewalks?	Partial		
Driveways?	No		

ROADWAY FACTORS

Length of Segment	0.680	miles
Width	64	feet
Vertical Curve?	No	
Horizontal Curve?	No	
Visibility	Good	
Roadway Conditions	Good	
Lighting	Yes	
Adjacent Land Use	Open space	

Field Study By GL

Checked By

CERTIFICATION: I, Gordon Lum, do hereby certify that this Engineering and Traffic Survey within the City of Hercules was performed under my supervision and is accurate and complete. I am duly registered in the State of California as a Professional Engineer (Traffic).


672 Gordon Lum

12/4/17

Date

TE 1542
State Registration Number

Spot Speed Study

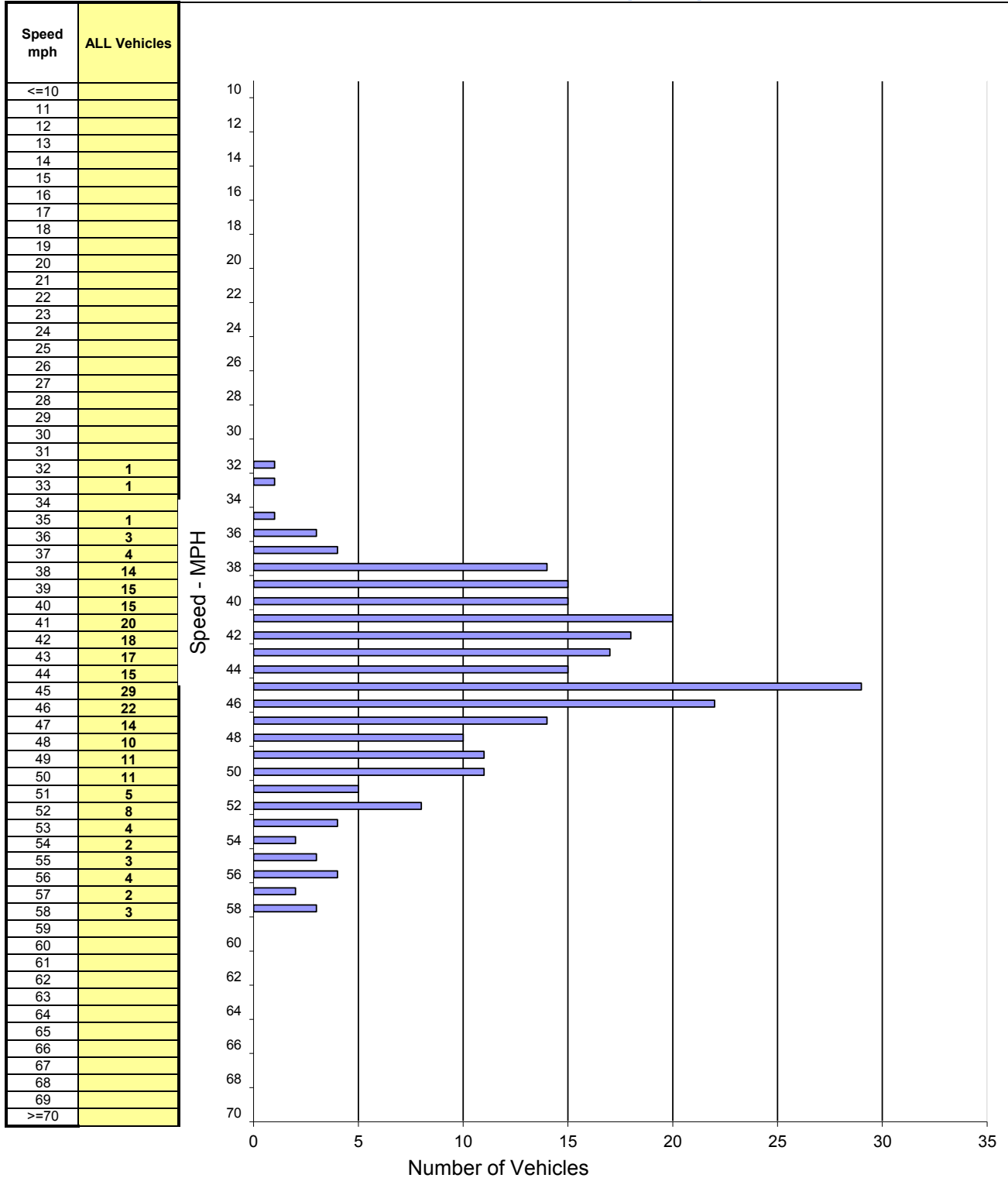
Prepared by: National Data & Surveying Services

City of Hercules

DATE: 5/17/2017
TIME: 16:05-17:00

Location: San Pablo Ave Bet. Sycamore Ave & So. City Limit
Posted Speed: 40 MPH Clear/Dry Project #: 17-7448-014

Northbound & Southbound Spot Speeds



SPEED PARAMETERS									
Class	Count	Range	50th Percentile	85th Percentile	10 MPH Pace	# in Pace	Percent in Pace	% / # Below Pace	% / # Above Pace
ALL	252	32 - 58	45 mph	50 mph	38 - 47	179	71%	3% / 10	25% / 63

CITY OF HERCULES
ENGINEERING AND TRAFFIC SURVEY

10

STREET Sycamore Avenue
FROM Civic Drive

CERTIFICATION DATE
TO Palm Avenue

SPEED FACTORS

Date of Speed Survey	5/17/2017	Posted Speed Limit	None mph
Time of Speed Survey	10a-113	Speed Justification	
50th Percentile Speed (Mean Speed)	35 mph	MUTCD Option 2	
85th Percentile Speed	39 mph		
Average Speed	0 mph		
10 mph Pace Speed	32-41		
Percentage of Vehicles in Pace	83	Recommended Speed Limit	35 mph
Number of Survey Samples	143		

COLLISION HISTORY

Number of Years Studied	5	years
Total Collisions	0	
Statewide Average Collision Rate	2.21	Collisions/MVM
Collisions per Million Vehicle Miles	0.000	Collisions/MVM

TRAFFIC FACTORS

Average Daily Traffic	9,053	Date Counted	5/31/2012
Number of Lanes	4		
Type of Traffic Control	Stop at Redwood, Lupine and Palm		
Crosswalks?	At Civic, Redwood, Lupine		
Pedestrian Traffic	Moderate		
Truck Traffic	Light		
On-Street Parking	No		
Sidewalks?	Yes		
Driveways?	Yes		

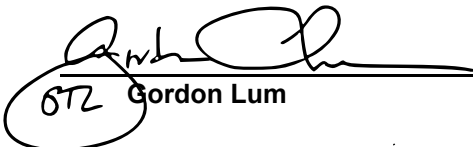
ROADWAY FACTORS

Length of Segment	0.480	miles
Width	80	feet
Vertical Curve?	Yes	
Horizontal Curve?	Yes	
Visibility	Good	
Roadway Conditions	Good	
Lighting	Yes	
Adjacent Land Use	Civic Center, Open space, homes side yard	

Field Study By GL

Checked By

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672 Gordon Lum

12/4/17
Date

TE 1542
State Registration Number

Spot Speed Study

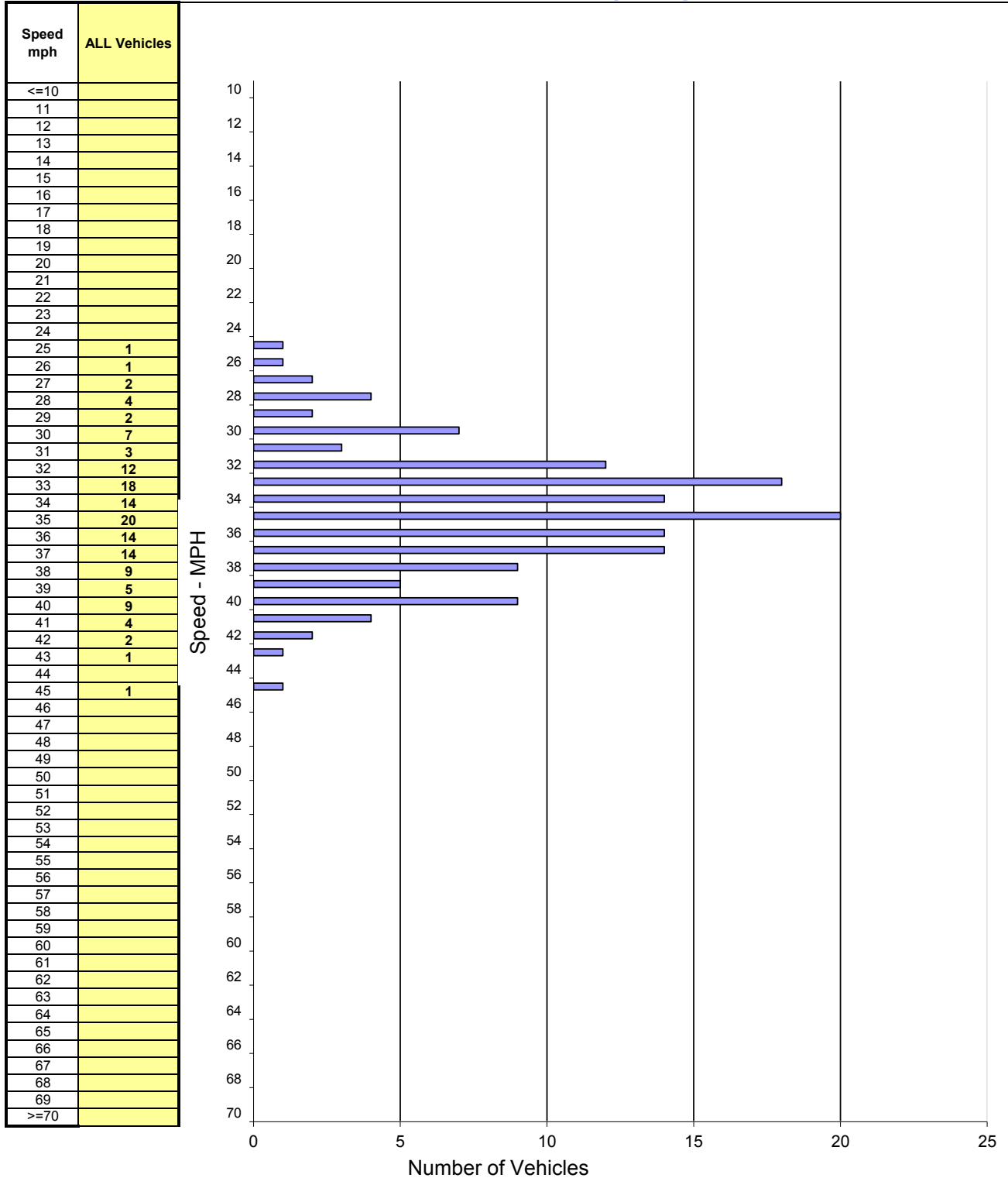
Prepared by: National Data & Surveying Services

City of Hercules

DATE: 5/17/2017
TIME: 10:30-11:30

Location: Sycamore Ave Bet. Redwood Rd & Palm Ave
Posted Speed: None Clear/Dry Project #: 17-7448-016

Eastbound & Westbound Spot Speeds



SPEED PARAMETERS									
Class	Count	Range	50th Percentile	85th Percentile	10 MPH Pace	# in Pace	Percent in Pace	% / # Below Pace	% / # Above Pace
ALL	143	25 - 45	35 mph	39 mph	32 - 41	119	83%	13% / 20	3% / 4

CITY OF HERCULES
ENGINEERING AND TRAFFIC SURVEY

11

STREET Sycamore Avenue
FROM Palm Avenue

CERTIFICATION DATE
TO SR 4 Ramps

SPEED FACTORS

Date of Speed Survey	5/17/2017	Posted Speed Limit	None mph
Time of Speed Survey	12-2p	Speed Justification	
50th Percentile Speed (Mean Speed)	42 mph	MUTCD Option 2	
85th Percentile Speed	45 mph		
Average Speed	0 mph		
10 mph Pace Speed	38-47		
Percentage of Vehicles in Pace	85	Recommended Speed Limit	40 mph
Number of Survey Samples	130		

COLLISION HISTORY

Number of Years Studied	5	years
Total Collisions	0	
Statewide Average Collision Rate	2.04	Collisions/MVM
Collisions per Million Vehicle Miles	0.000	Collisions/MVM

TRAFFIC FACTORS

Average Daily Traffic	2,696	Date Counted	6/7/2012
Number of Lanes	2		
Type of Traffic Control	Stop at Palm and SR-4 Ramps		
Crosswalks?	None		
Pedestrian Traffic	None		
Truck Traffic	Light		
On-Street Parking	No		
Sidewalks?	No		
Driveways?	Two		

ROADWAY FACTORS

Length of Segment	0.620	miles
Width	24	feet
Vertical Curve?	No	
Horizontal Curve?	No	
Visibility	Good	
Roadway Conditions	Good	
Lighting	No	
Adjacent Land Use	Open space	

Field Study By GL

Checked By

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012 Gordon Lum

12/4/17

Date

TE 1542

State Registration Number

Spot Speed Study

Prepared by: National Data & Surveying Services

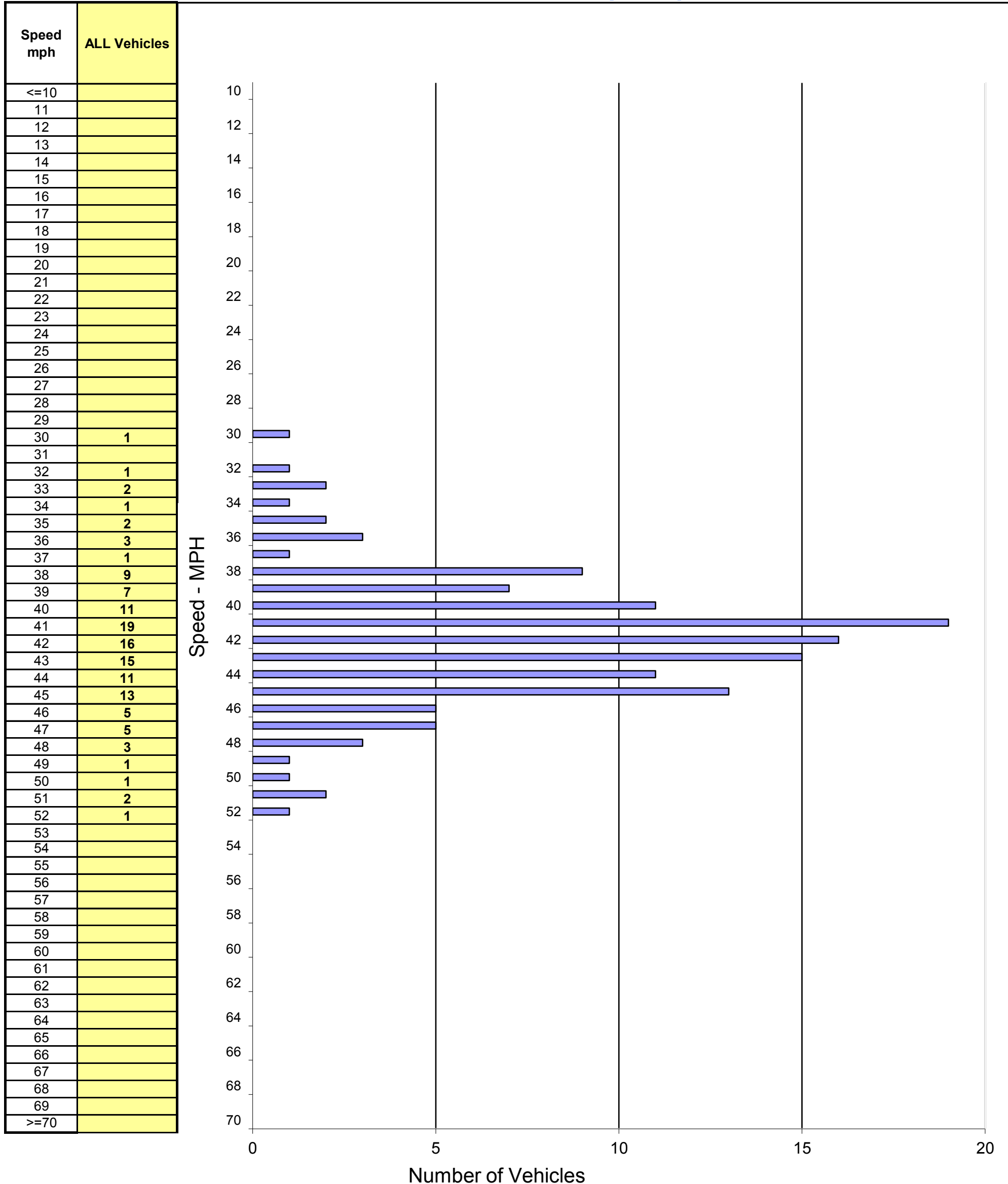
City of Hercules

DATE: 5/17/2017
TIME: 11:50-13:50

Location: Sycamore Ave Bet. Palm Ave & SR 4 ramps
Posted Speed: None Clear/Dry

Project #: 17-7448-017

Eastbound & Westbound Spot Speeds



SPEED PARAMETERS									
Class	Count	Range	50th Percentile	85th Percentile	10 MPH Pace	# in Pace	Percent in Pace	% / # Below Pace	% / # Above Pace
ALL	130	30 - 52	42 mph	45 mph	38 - 47	111	85%	8% / 11	7% / 8

CITY OF HERCULES
ENGINEERING AND TRAFFIC SURVEY

12

STREET Turquoise Drive
FROM Sycamore Avenue

CERTIFICATION DATE
TO Cinnabar Way

SPEED FACTORS

Date of Speed Survey	5/17/2017	Posted Speed Limit	30 mph
Time of Speed Survey	140-225	Speed Justification	
50th Percentile Speed (Mean Speed)	29 mph	MUTCD Option 2	
85th Percentile Speed	33 mph		
Average Speed	mph		
10 mph Pace Speed	25-34		
Percentage of Vehicles in Pace	89	Recommended Speed Limit	30 mph
Number of Survey Samples	210		

COLLISION HISTORY

Number of Years Studied	years
Total Collisions	
Statewide Average Collision Rate	Collisions/MVM
Collisions per Million Vehicle Miles	Collisions/MVM

TRAFFIC FACTORS

Average Daily Traffic	3,901	Date Counted	5/31/2012
Number of Lanes	4		
Type of Traffic Control	Signal: Sycamore; Stop: Lucky Dwy, Cinnabar, Crystal		
Crosswalks?	At Sycamore, Crystal		
Pedestrian Traffic	Light		
Truck Traffic	Light		
On-Street Parking	Yes		
Sidewalks?	Yes		
Driveways?	Yes		

ROADWAY FACTORS

Length of Segment	0.340 miles
Width	64 feet
Vertical Curve?	Yes
Horizontal Curve?	Yes
Visibility	Good
Roadway Conditions	Good
Lighting	Yes
Adjacent Land Use	Home side yards, Retail

Field Study By GL

Checked By

CERTIFICATION: I, Gordon Lum, do hereby certify that this Engineering and Traffic Survey within the City of Hercules was performed under my supervision and is accurate and complete. I am duly registered in the State of California as a Professional Engineer (Traffic).


672 Gordon Lum

12/4/17

Date

TE 1542

State Registration Number

Spot Speed Study

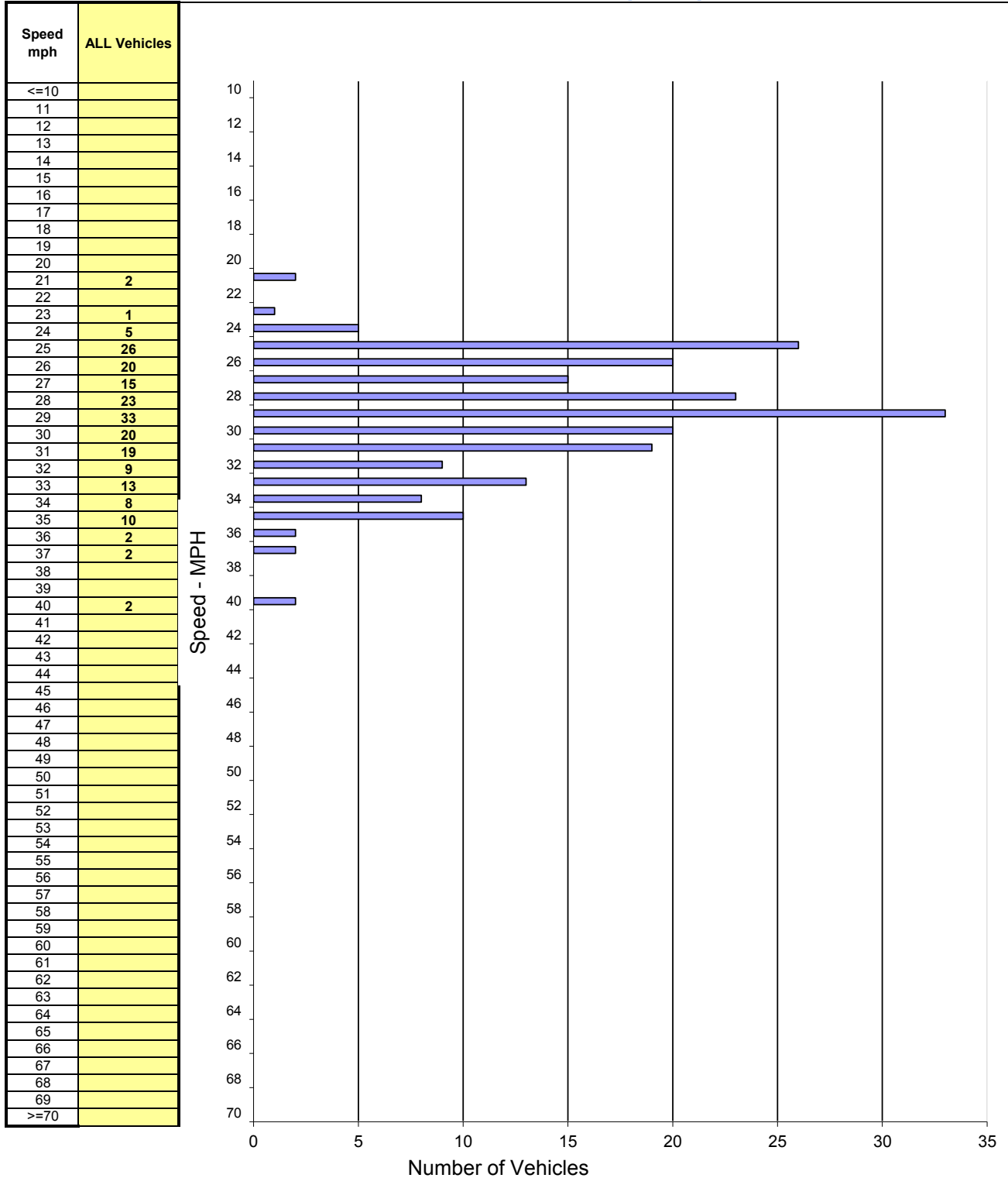
Prepared by: National Data & Surveying Services

City of Hercules

DATE: 5/17/2017
TIME: 13:40-14:25

Location: Turquoise Dr Bet. Sycamore Ave & Cinnabar Way
Posted Speed: 25 MPH Clear/Dry Project #: 17-7448-018

Northbound & Southbound Spot Speeds



SPEED PARAMETERS									
Class	Count	Range	50th Percentile	85th Percentile	10 MPH Pace	# in Pace	Percent in Pace	% / # Below Pace	% / # Above Pace
ALL	210	21 - 40	29 mph	33 mph	25 - 34	186	89%	3% / 8	8% / 16

CITY OF HERCULES
ENGINEERING AND TRAFFIC SURVEY

13

STREET Willow Avenue
FROM San Pablo Avenue

CERTIFICATION DATE
TO Canterbury Drive

SPEED FACTORS

Date of Speed Survey	5/17/2017	Posted Speed Limit	40 mph
Time of Speed Survey	10a-111	Speed Justification	
50th Percentile Speed (Mean Speed)	37 mph	Closest 5 mph increment	
85th Percentile Speed	42 mph		
Average Speed	mph		
10 mph Pace Speed	33-42		
Percentage of Vehicles in Pace	75	Recommended Speed Limit	40 mph
Number of Survey Samples	252		

COLLISION HISTORY

Number of Years Studied	0	years
Total Collisions		
Statewide Average Collision Rate		Collisions/MVM
Collisions per Million Vehicle Miles		Collisions/MVM

TRAFFIC FACTORS

Average Daily Traffic	11,160	Date Counted	6/6/2012
Number of Lanes	2-4		
Type of Traffic Control	Signal: San Pablo, Hawthorne, I-80 ramps: Stop: Cntrbry		
Crosswalks?	At San Pablo, I-80 ramps, Canterbury, Hawthorne		
Pedestrian Traffic	Light		
Truck Traffic	Light		
On-Street Parking	Yes		
Sidewalks?	yes		
Driveways?	Yes		

ROADWAY FACTORS

Length of Segment	0.750	miles
Width	80	feet
Vertical Curve?	No	
Horizontal Curve?	Yes	
Visibility	Good	
Roadway Conditions	Good	
Lighting	Yes	
Adjacent Land Use	Apts, retail, open space	

Field Study By GL

Checked By

CERTIFICATION: I, Gordon Lum, do hereby certify that this Engineering and Traffic Survey within the City of Hercules was performed under my supervision and is accurate and complete. I am duly registered in the State of California as a Professional Engineer (Traffic).


672 Gordon Lum

12/4/17

Date

TE 1542

State Registration Number

Spot Speed Study

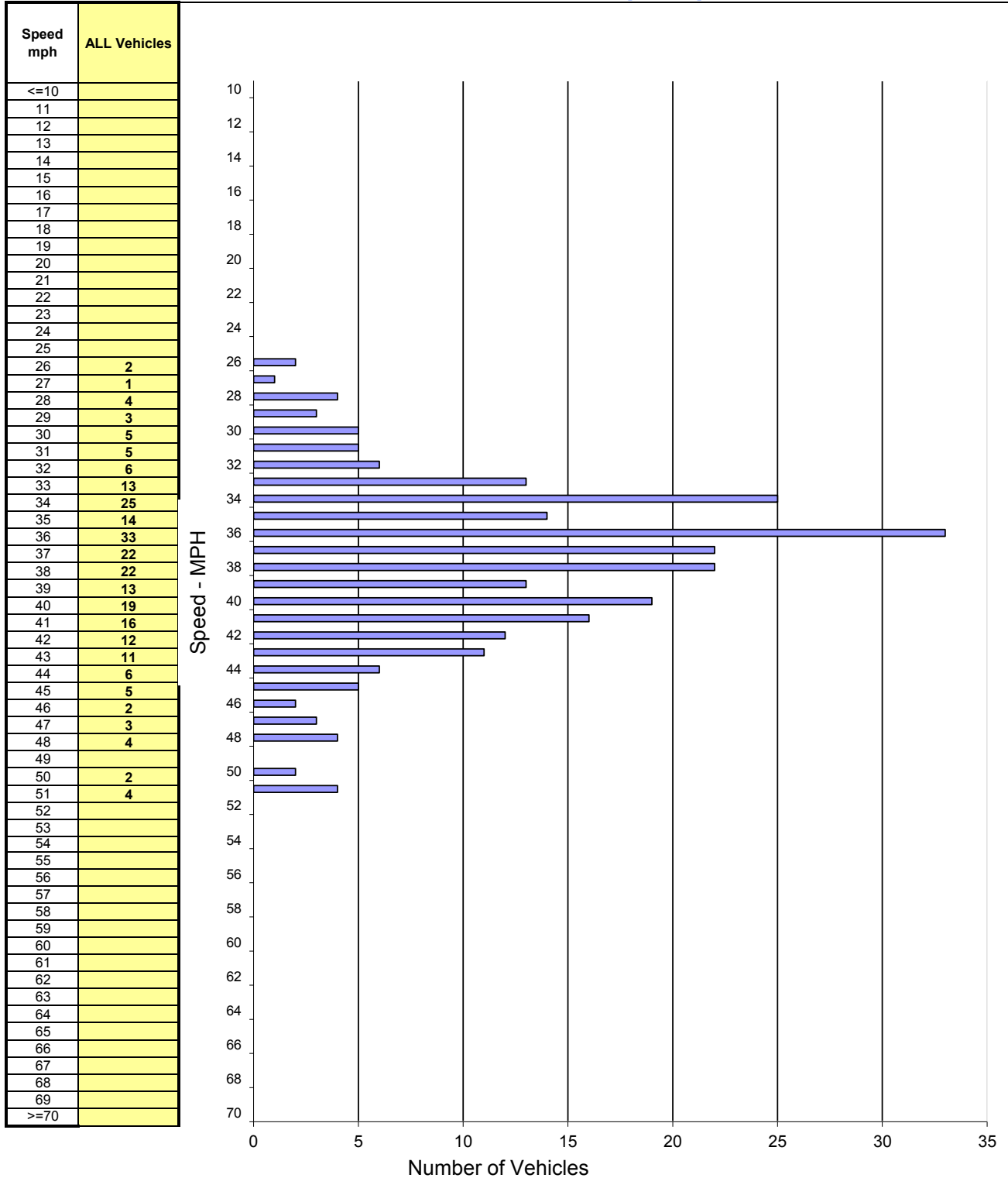
Prepared by: National Data & Surveying Services

City of Hercules

DATE: 5/17/2017
TIME: 10:15-11:15

Location: Willow Ave Bet. San Pablo Ave & Canterbury Dr
Posted Speed: 40 MPH Clear/Dry Project #: 17-7448-020

Northbound & Southbound Spot Speeds



SPEED PARAMETERS									
Class	Count	Range	50th Percentile	85th Percentile	10 MPH Pace	# in Pace	Percent in Pace	% / # Below Pace	% / # Above Pace
ALL	252	26 - 51	37 mph	42 mph	33 - 42	189	75%	10% / 26	15% / 37

Spot Speed Study

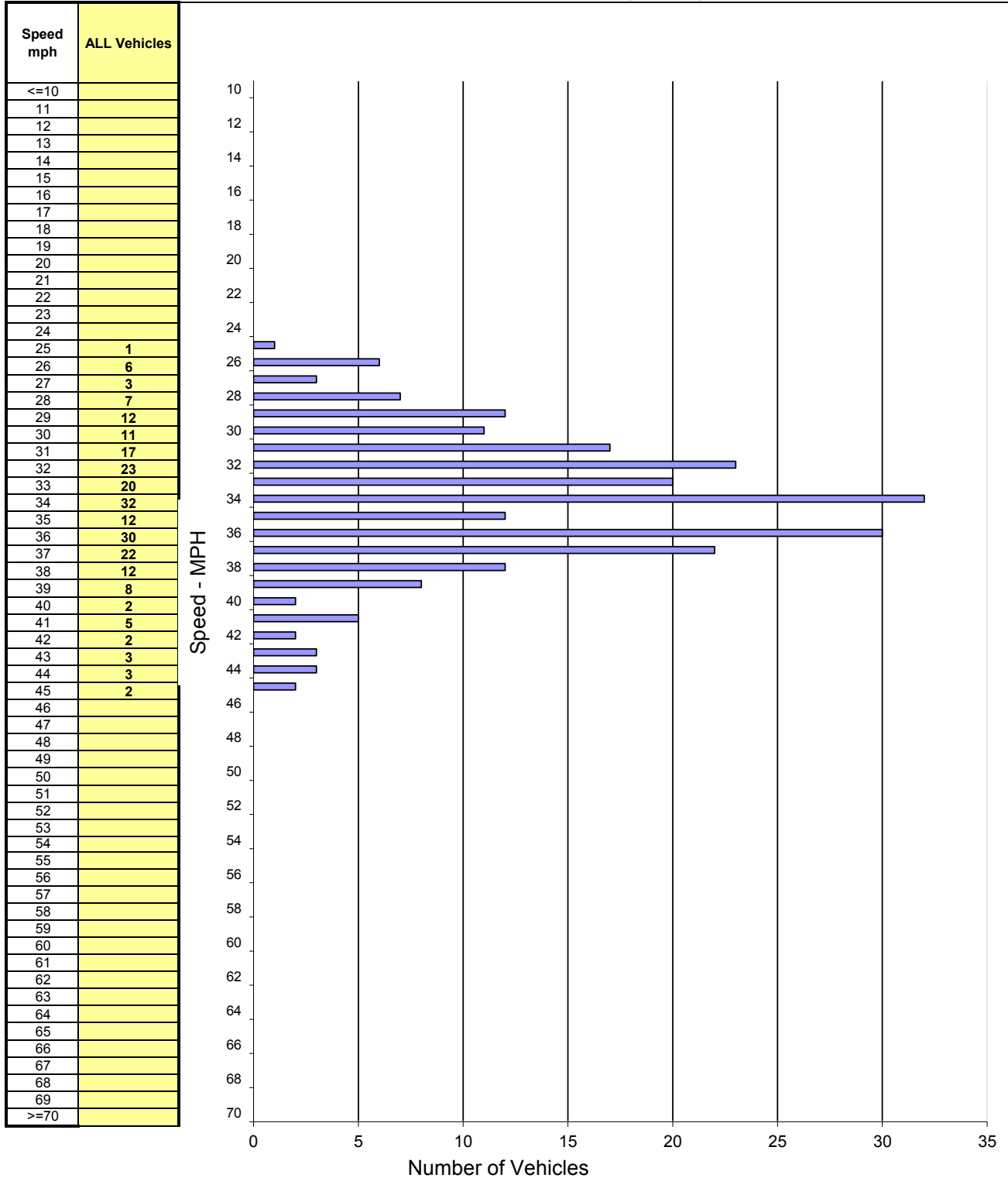
Prepared by: National Data & Surveying Services

City of Hercules

DATE: 5/17/2017
TIME: 11:30-12:25

Location: Willow Ave Bet. Palm Ave & I-80 ramps
Posted Speed: 40 MPH Clear/Dry Project #: 17-7448-023

Northbound & Southbound Spot Speeds



SPEED PARAMETERS									
Class	Count	Range	50th Percentile	85th Percentile	10 MPH Pace	# in Pace	Percent in Pace	% / # Below Pace	% / # Above Pace
ALL	233	25 - 45	34 mph	38 mph	29 - 38	191	82%	7% / 17	11% / 25

CITY OF HERCULES
ENGINEERING AND TRAFFIC SURVEY

15

STREET Willow Avenue
FROM Palm Avenue

CERTIFICATION DATE
TO Sycamore

SPEED FACTORS

Date of Speed Survey	5/16/2017	Posted Speed Limit	40 mph
Time of Speed Survey	1050-12	Speed Justification	
50th Percentile Speed (Mean Speed)	37 mph	MUTCD Option 2	
85th Percentile Speed	41 mph		
Average Speed	mph		
10 mph Pace Speed	32-41		
Percentage of Vehicles in Pace	85	Recommended Speed Limit	40 mph
Number of Survey Samples	179		

COLLISION HISTORY

Number of Years Studied	0	years
Total Collisions		
Statewide Average Collision Rate		Collisions/MVM
Collisions per Million Vehicle Miles		Collisions/MVM

TRAFFIC FACTORS

Average Daily Traffic	8,853	Date Counted	5/30/2012
Number of Lanes	2		
Type of Traffic Control	Signal at Sycamore; Stop at SR-4 ramps		
Crosswalks?	at SR-4 ramps		
Pedestrian Traffic	Light		
Truck Traffic	Light		
On-Street Parking	No		
Sidewalks?	No		
Driveways?	Yes		

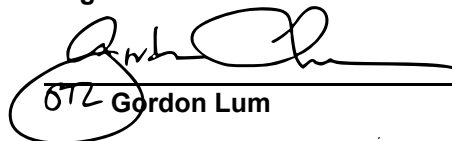
ROADWAY FACTORS

Length of Segment	0.700	miles
Width	56	feet
Vertical Curve?	No	
Horizontal Curve?	Yes	
Visibility	Good	
Roadway Conditions	Good	
Lighting	Yes	
Adjacent Land Use	Transit Ctr, Maint. Yard	

Field Study By GL

Checked By

CERTIFICATION: I, Gordon Lum, do hereby certify that this Engineering and Traffic Survey within the City of Hercules was performed under my supervision and is accurate and complete. I am duly registered in the State of California as a Professional Engineer (Traffic).


672 Gordon Lum

12/4/17

Date

TE 1542
State Registration Number

Spot Speed Study

Prepared by: National Data & Surveying Services

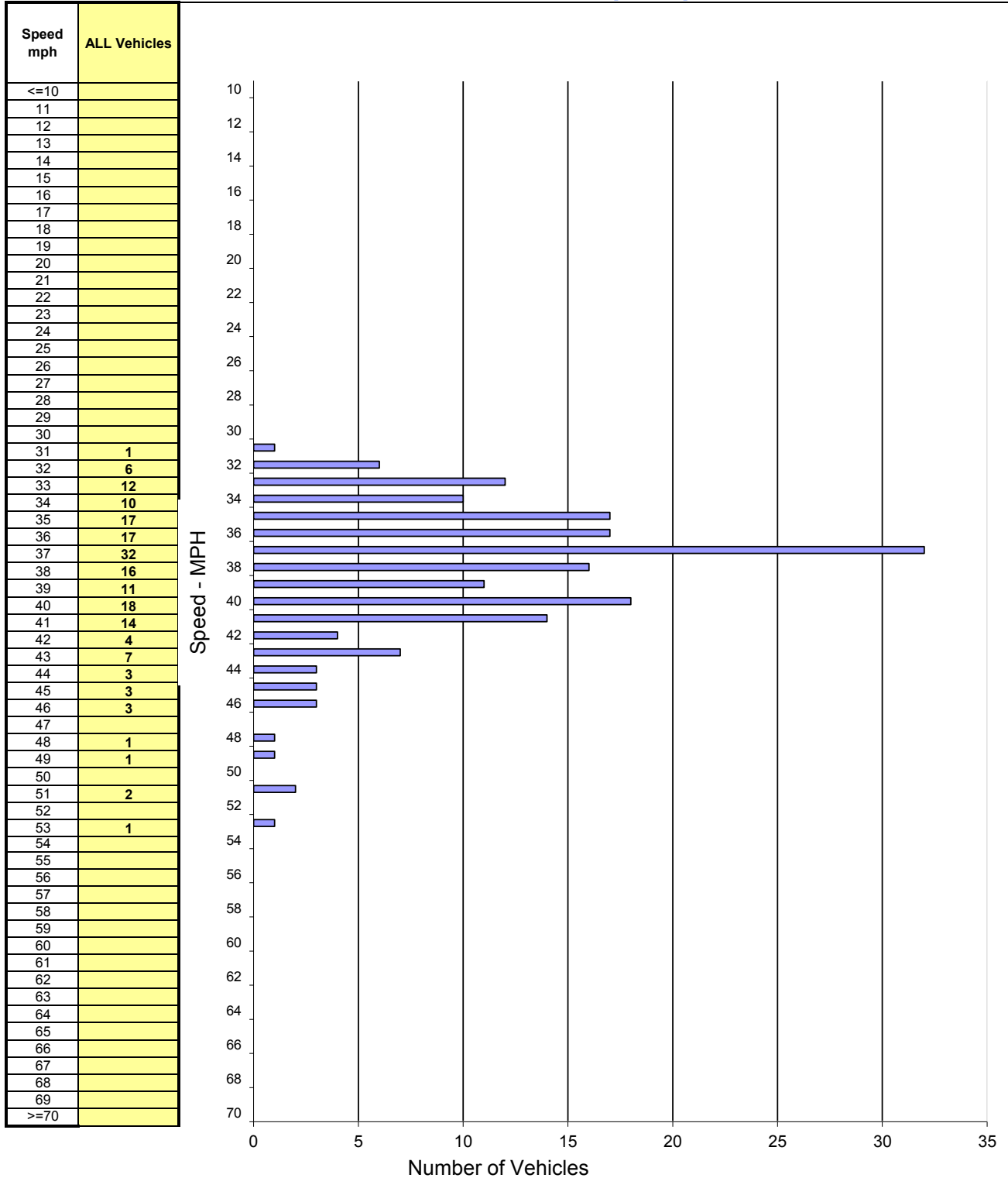
City of Hercules

DATE: 5/16/2017
TIME: 10:50-12:00

Location: Willow Ave Bet. SR 4 & Palm Ave
Posted Speed: Clear/Dry

Project #: 17-7448-022

Eastbound & Westbound Spot Speeds



SPEED PARAMETERS									
Class	Count	Range	50th Percentile	85th Percentile	10 MPH Pace	# in Pace	Percent in Pace	% / # Below Pace	% / # Above Pace
ALL	179	31 - 53	37 mph	41 mph	32 - 41	153	85%	0% / 1	14% / 25

APPENDIX B

Survey Equipment

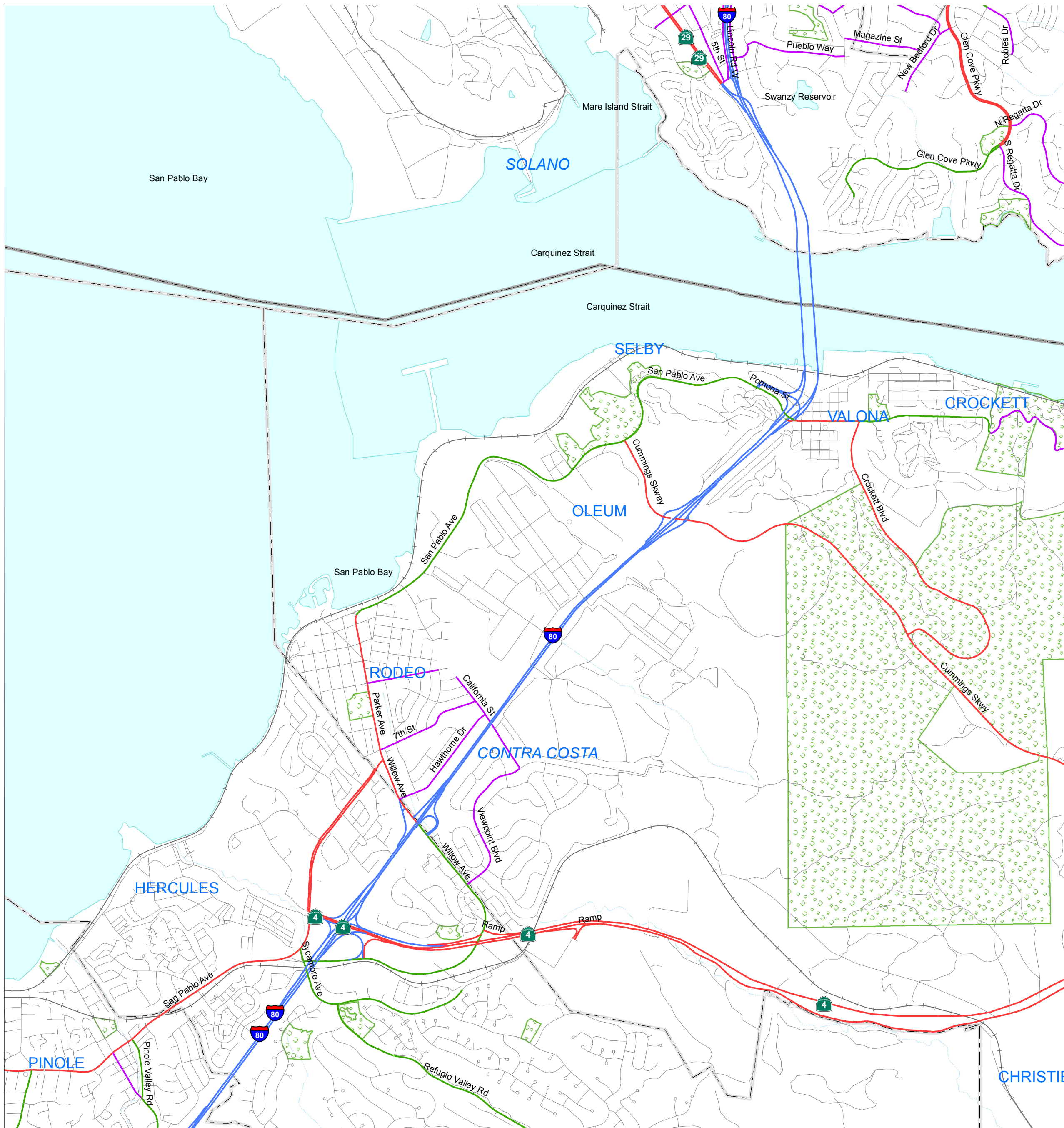
SURVEY EQUIPMENT USED

The radar equipment used to collect speed measurements for this survey was a Phantom Type III Hand-Held Traffic Radar manufactured by Astro Products. The calibration of the unit was checked before each series of measurements were taken. Tests of the unit were conducted in accordance with the manufacturer's specifications. The Phantom Type III Hand-Held Traffic Radar was last calibrated on December 16, 2013 by RHF Inc.

APPENDIX C

California Road System Maps

SEE MAP 5K33

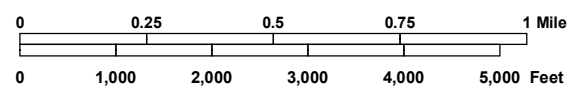


SEE MAP 5K42

SEE MAP 5K44

SEE MAP 5K53

APPROVED Date: 03/27/2013
 FEDERAL HIGHWAY ADMINISTRATION
Wesley Patrick-Pearce
 FOR: VINCENT P. MAMMANO
 DIVISION ADMINISTRATOR



STATE OF CALIFORNIA
 DEPARTMENT OF TRANSPORTATION
 In Cooperation With The
 FEDERAL HIGHWAY ADMINISTRATION
 AND LOCAL AGENCIES

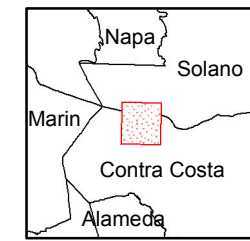


--- COUNTY BOUNDARY
 - - - CITY BOUNDARY
 = = = RAILROAD

SIGN ROUTES
 INTERSTATE
 U.S.
 STATE

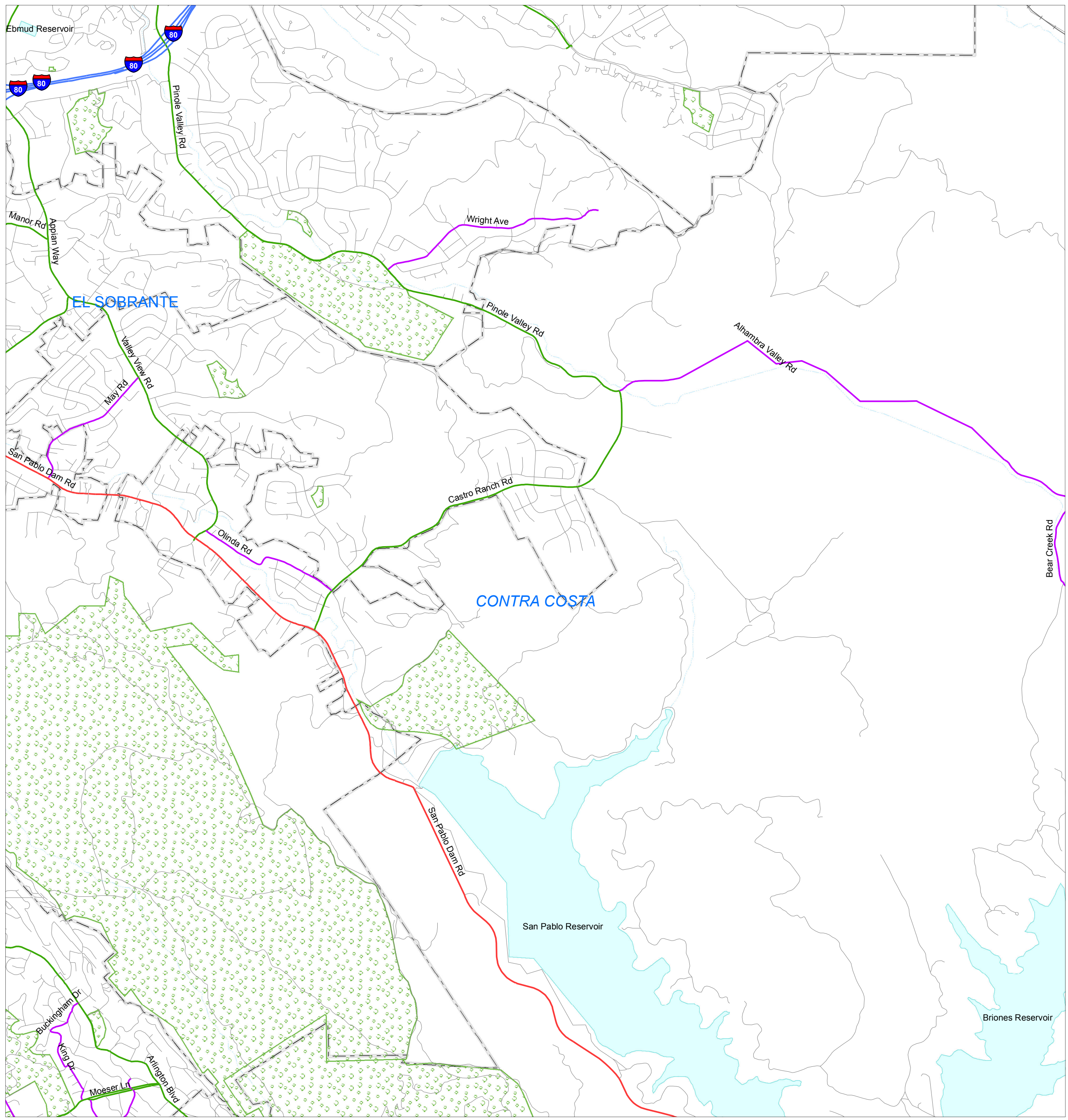
FUNCTIONAL CLASSIFICATION SYSTEM

INTERSTATE	1	
OTHER FWY OR EXPWY	2	
OTHER PRINCIPAL ARTERIAL	3	
MINOR ARTERIAL	4	
MAJOR COLLECTOR	5	
MINOR COLLECTOR	6	
LOCAL	7	



MAP 5K43

SEE MAP 5K43

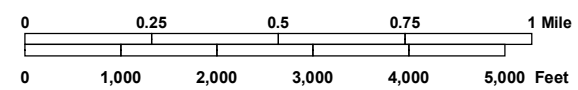


SEE MAP 5K52

SEE MAP 5K54

SEE MAP 5L13

APPROVED Date: 03/27/2013
 FEDERAL HIGHWAY ADMINISTRATION
Wesley Rutland-Pear
 FOR: VINCENT P. MAMMAMO
 DIVISION ADMINISTRATOR



STATE OF CALIFORNIA
 DEPARTMENT OF TRANSPORTATION
 In Cooperation With The
 FEDERAL HIGHWAY ADMINISTRATION
 AND LOCAL AGENCIES



--- COUNTY BOUNDARY
 - - - CITY BOUNDARY
 + + + RAILROAD

SIGN ROUTES
 INTERSTATE
 U.S.
 STATE

FUNCTIONAL CLASSIFICATION SYSTEM

INTERSTATE	1	
OTHER FWY OR EXPWY	2	
OTHER PRINCIPAL ARTERIAL	3	
MINOR ARTERIAL	4	
MAJOR COLLECTOR	5	
MINOR COLLECTOR	6	
LOCAL	7	



MAP 5K53