

**Marquez
Transportation
Engineering**

May 7, 2018

Nader Oweis, Chief of Police
University of California Santa Cruz
1156 High Street
Santa Cruz CA 95064

Dear Chief Oweis:

This letter transmits the Engineering and Traffic Surveys prepared for the University. The basis of my work has been the speed surveys measured during April this year. The objective of this work has been to identify recommended speed limits consistent with the California Vehicle Code and California Manual of Uniform Traffic Control Devices procedures.

The recommendations contained in this report are intended to establish prima facie speed limits. Prima facie limits advise the motorist and enforcement of the reasonable speed for a particular section of roadway for the prevailing conditions. The following factors are considered in this work.

- The **85th Percentile Speed** is that speed at or below which 85 percent of the traffic is moving.
- The **10-mph Pace** is the 10 mph range which contains the largest volume of observations.
- The **Percent of Vehicles in the Pace** is an indication of the grouping of observed vehicle speeds.
- The **Collision History** of the road segment may highlight conditions not observed by driver. For purpose of this effort a three year collision history was evaluated.

The Engineering and Traffic Survey Sheets for each of the road segments analyzed are enclosed with this letter. The attached table summarizes the results.

I have appreciated the opportunity to help the University in this effort to improve safety for those traveling on the campus.

Sincerely,



Ron Marquez, P.E

cc: Larry Pageler, TAPS

**UCSC Engineering and Traffic Survey
Recommendations 2018**

Street Name	Limits	<u>Critical Speed</u>	<u>Recommended Speed Limit</u>
Coolidge Dr	High St. to Hagar Drive	35	30
Coolidge Dr	Hagar Dr. to McLaughlin Dr.	50	45
Hagar Dr	Coolidge Dr. to East Remote	45	40
Hagar Dr	East Remote to McLaughlin Dr	35	30
Heller Dr	Empire Grade to Koshland Way	30	25
Heller Dr	Koshland Way to Meyer Dr	25	25
Heller Dr	Meyer Dr. to Core West entrance	25	25
McLaughlin Dr	Heller Dr. to Red Hill Rd	20	15
McLaughlin Dr	Red Hill Rd to Hagar Dr	20	15
McLaughlin Dr	Hagar Dr. to Coolidge Dr.	35	30

**University of California at Santa Cruz
Engineering and Traffic Survey**

Street:	McLaughlin Drive	Prepared by	RJM
Limits:	Red Hill Rd to Hagar Dr	Date:	5-7-2018

Factors

A. Prevailing Speed Data

Location of Survey	Midpoint		Midpoint	
	Eastbound	Eastbound	Westbound	Westbound
Direction	20 mph		19 mph	
85th Percentile	20 mph		19 mph	
10 mph Pace	13 mph	22 mph	12 mph	21 mph
Percent in Pace	100		92	
Posted Speed Limit	15 mph		15 mph	

B. Collision History

Date Range	1/1/2015 to 12/31/2017		
Type	Total	Injury	PDO
Total	4	2	2

C. Traffic Factors

Average Daily Traffic	8,500
Length of Segment	1,300 ft
Width of Segment	30 ft
Number of Travel Lanes	2 auto
Adjacent Land Use	Student facilities

D. Conditions Not Readily Apparent

Conditions	
Roadway Geometries	Narrow roadway limited shoulder
Comments	Little room for escape maneuver. Pedestrian activity high

Survey Results

Posted Speed Limit	25 mph
Critical Speed *	20 mph
Reduction for Conditions Not Apparent	Narrow roadway with limited shoulder and collision history
Recommended Speed Limit	15 mph

* 85th percentile to the nearest 5 mph

Approved

Ronald Marquez, P. E.

Traffic Engineer

Date: May 7, 2018



**University of California at Santa Cruz
Engineering and Traffic Survey**

Street:	McLaughlin Drive	Prepared by	RJM
Limits:	Hagar Dr to Coolidge Dr	Date:	5-7-2018

Factors

A. Prevailing Speed Data

Location of Survey	Midpoint		Midpoint	
	Eastbound	Eastbound	Westbound	Westbound
Direction				
85th Percentile	35 mph		36 mph	
10 mph Pace	26 mph	35 mph	24 mph	33 mph
Percent in Pace	72		60	
Posted Speed Limit	25 mph		25 mph	

B. Collision History

Date Range	1/1/2015 to 12/31/2017		
Type	Total	Injury	PDO
Total	0	0	0

C. Traffic Factors

Average Daily Traffic	8,500
Length of Segment	1,100 ft
Width of Segment	30 ft
Number of Travel Lanes	2 auto
Adjacent Land Use	Open space

D. Conditions Not Readily Apparent


Conditions	
Roadway Geometrics	Narrow roadway limited shoulder
Comments	Little room for escape maneuver

Survey Results

Posted Speed Limit	25 mph
Critical Speed *	35 mph
Reduction for Conditions Not Apparent	Narrow roadway with limited shoulder
Recommended Speed Limit	30 mph

* 85th percentile to the nearest 5 mph

Approved

<p>Ronald Marquez, P. E.</p> <p>Traffic Engineer</p> <p>Date: May 7, 2018</p>	
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**University of California at Santa Cruz
Engineering and Traffic Survey**

Street:	McLaughlin Drive	Prepared by	RJM
Limits:	Heller Drive to Red Hill Road	Date:	5-7-2018

Factors

A. Prevailing Speed Data

Location of Survey	Midpoint		Midpoint	
	Eastbound	Eastbound	Westbound	Westbound
Direction	22 mph		22 mph	
85th Percentile				
10 mph Pace	12 mph	21 mph	14 mph	23 mph
Percent in Pace	84		82	
Posted Speed Limit	15 mph		15 mph	

B. Collision History

Date Range	1/1/2015 to 12/31/2017		
Type	Total	Injury	PDO
Total	0	0	0

C. Traffic Factors

Average Daily Traffic	4,500
Length of Segment	700 ft
Width of Segment	30 ft
Number of Travel Lanes	2 auto
Adjacent Land Use	institution

D. Conditions Not Readily Apparent


Conditions	Numerous pedestrian crossings
Roadway Geometrics	Narrow shoulder
Comments	High pedestrian activity

Survey Results

Posted Speed Limit	15 mph
Critical Speed *	20 mph
Reduction for Conditions Not Apparent	Pedestrian activity very high
Recommended Speed Limit	15 mph

* 85th percentile to the nearest 5 mph

Approved

<p>Ronald Marquez, P. E.</p> <p>Traffic Engineer</p> <p>Date: May 7, 2018</p>	
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**University of California at Santa Cruz
Engineering and Traffic Survey**

Street:	Heller Drive	Prepared by	RJM
Limits:	Meyer Dr to Core West	Date:	5-7-2018

Factors

A. Prevailing Speed Data

Location of Survey	Midpoint		Midpoint	
	Northbound	Northbound	Southbound	Southbound
85th Percentile	27 mph		28 mph	
10 mph Pace	18 mph	27 mph	19 mph	28 mph
Percent in Pace	92		76	
Posted Speed Limit	25 mph		25 mph	

B. Collision History

Date Range	1/1/2015 to 12/31/2017		
Type	Total	Injury	PDO
Total	0	0	0

C. Traffic Factors

Average Daily Traffic	5,000
Length of Segment	3,000 ft
Width of Segment	30-35 ft
Number of Travel Lanes	2 auto park 1 side north of McLaughlin
Adjacent Land Use	Open Space

D. Conditions Not Readily Apparent


Conditions	Several Stop sing controls
Roadway Geometrics	Horizontal and vertical curves narrow shoulder
Comments	Parking activity high northern section for southbound travel

Survey Results

Posted Speed Limit	25 mph
Critical Speed *	25 mph
Reduction for Conditions Not Apparent	Road geometry reduces stopping sight distance, high parking activity
Recommended Speed Limit	25 mph

* 85th percentile to the nearest 5 mph

Approved

<p>Ronald Marquez, P. E.</p> <p>Traffic Engineer</p> <p>Date: May 7, 2018</p>	
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**University of California at Santa Cruz
Engineering and Traffic Survey**

Street:	Heller Drive	Prepared by	RJM
Limits:	Koshland Way to Meyer Drive	Date:	5-7-2018

Factors

A. Prevailing Speed Data

Location of Survey	Midpoint		Midpoint	
	Northbound	Northbound	Southbound	Southbound
85th Percentile	27 mph		26 mph	
10 mph Pace	18 mph	27 mph	18 mph	27 mph
Percent in Pace	89		92	
Posted Speed Limit	25 mph		25 mph	

B. Collision History

Date Range	1/1/2015 to 12/31/2017		
Type	Total	Injury	PDO
Total	1	0	1

C. Traffic Factors

Average Daily Traffic	8,500
Length of Segment	1,500 ft
Width of Segment	40 ft
Number of Travel Lanes	2 auto 2 bike
Adjacent Land Use	Open space

D. Conditions Not Readily Apparent


Conditions	Bicycle usage high
Roadway Geometrics	Horizontal and vertical curvature
Comments	Downgrade increases stopping distance

Survey Results

Posted Speed Limit	25 mph
Critical Speed *	25 mph
Reduction for Conditions Not Apparent	Increased stopping distance, reduced visibility and bicycle usage
Recommended Speed Limit	25 mph

* 85th percentile to the nearest 5 mph

Approved

<p>Ronald Marquez, P. E.</p> <p>Traffic Engineer</p> <p>Date: May 7, 2018</p>	
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**University of California at Santa Cruz
Engineering and Traffic Survey**

Street:	Heller Drive	Prepared by	RJM
Limits:	Empire Grade to Koshland Way	Date:	5-7-2018

Factors

A. Prevailing Speed Data

Location of Survey	Midpoint		Midpoint	
	Northbound	Northbound	Southbound	Southbound
85th Percentile	33 mph		30 mph	
10 mph Pace	25 mph	34 mph	22mph	31 mph
Percent in Pace	76		82	
Posted Speed Limit	25 mph		25 mph	

B. Collision History

Date Range	1/1/2015 to 12/31/2017		
Type	Total	Injury	PDO
Total	5	0	5

C. Traffic Factors

Average Daily Traffic	8,500
Length of Segment	1,000 ft
Width of Segment	40 ft
Number of Travel Lanes	2 auto 2 bike lanes
Adjacent Land Use	Open space

D. Conditions Not Readily Apparent

Conditions	
Roadway Geometrics	Downgrade increases stopping distance
Comments	Bicycle ridership high

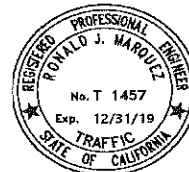
Survey Results

Posted Speed Limit	25 mph
Critical Speed *	30 mph
Reduction for Conditions Not Apparent	Downgrade stopping distance is increased and bicycle probability high
Recommended Speed Limit	25 mph

* 85th percentile to the nearest 5 mph

Approved

Ronald Marquez, P. E.
Traffic Engineer
Date: May 7, 2018



**University of California at Santa Cruz
Engineering and Traffic Survey**

Street:	Coolidge Drive	Prepared by	RJM
Limits:	Hagar Drive to McLaughlin Dr.	Date:	5-7-2018

Factors

A. Prevailing Speed Data

Location of Survey	Midpoint		Midpoint	
	Northbound	Northbound	Southbound	Southbound
85th Percentile	53		50	
10 mph Pace	44	53	43	52
Percent in Pace	72		68	
Posted Speed Limit	45		45	

B. Collision History

Date Range	1/1/2015 to 12/31/2017		
Type	Total	Injury	PDO
Total	3	1	2

C. Traffic Factors

Average Daily Traffic	4,000
Length of Segment	7,200 ft
Width of Segment	40 ft
Number of Travel Lanes	2 auto 2 bike
Adjacent Land Use	open space

D. Conditions Not Readily Apparent

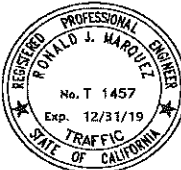
Conditions	Bicycle activity high
Roadway Geometrics	Horizontal and vertical curvature
Comments	Downgrade increases stopping distance Midpoint access collision history slow curve at terminus

Survey Results

Posted Speed Limit	45 mph
Critical Speed *	50 mph
Reduction for Conditions Not Apparent	Curvature, collision history and increased stopping distance
Recommended Speed Limit	45 mph

* 85th percentile to the nearest 5 mph

Approved

<p>Ronald Marquez, P. E.</p> <p>Traffic Engineer</p> <p>Date: May 7, 2018</p>	
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**University of California at Santa Cruz
Engineering and Traffic Survey**

Street:	Hagar Drive	Prepared by	RJM
Limits:	East Remote to McLaughlin Drive	Date:	5-7-2018

Factors

A. Prevailing Speed Data

Location of Survey	Midpoint		Midpoint	
	Northbound	Northbound	Southbound	Southbound
85th Percentile	33 mph		36 mph	
10 mph Pace	24 mph	33 mph	24 mph	33 mph
Percent in Pace	64		55	
Posted Speed Limit	25 mph		25 mph	

B. Collision History

Date Range	1/1/2015 to 12/31/2017		
Type	Total	Injury	PDO
Total	1	1	0

C. Traffic Factors

Average Daily Traffic	4,000
Length of Segment	2,500 ft
Width of Segment	26 ft
Number of Travel Lanes	2 auto
Adjacent Land Use	Student facilities

D. Conditions Not Readily Apparent

Conditions	Bicycle ridership high with no bike lanes Pedestrian activity high
Roadway Geometrics	2 lanes no shoulder or escape area
Comments	Downgrade increases stopping distance

Survey Results

Posted Speed Limit	25 mph
Critical Speed *	35 mph
Reduction for Conditions Not Apparent	No shoulder or bike lane with high volume of bicycle riders
Recommended Speed Limit	30 mph

* 85th percentile to the nearest 5 mph

Approved

Ronald Marquez, P. E.

Traffic Engineer

Date: May 7, 2018



**University of California at Santa Cruz
Engineering and Traffic Survey**

Street:	Hagar Dr	Prepared by	RJM
Limits:	Coolidge Dr to East Remote	Date:	5-7-2018

Factors

A. Prevailing Speed Data

Location of Survey	Midpoint		Midpoint	
	Northbound	Northbound	Southbound	Southbound
85th Percentile	42 mph		49 mph	
10 mph Pace	35 mph	44 mph	36 mph	45 mph
Percent in Pace	61		63	
Posted Speed Limit	35 mph		35 mph	

B. Collision History

Date Range	1/1/2015 to 12/31/2017		
Type	Total	Injury	PDO
Total	5	0	5

C. Traffic Factors

Average Daily Traffic	9,000
Length of Segment	4,500 ft
Width of Segment	40 ft
Number of Travel Lanes	2 auto 2 bike
Adjacent Land Use	Open space

D. Conditions Not Readily Apparent

Conditions	
Roadway Geometries	Long grade
Comments	Stopping distance reduced Bicycle ridership high

Survey Results

Posted Speed Limit	35 mph
Critical Speed *	45 mph
Reduction for Conditions Not Apparent	Downgrade increases stopping distance and high bicycle rider volume
Recommended Speed Limit	40 mph

* 85th percentile to the nearest 5 mph

Approved

Ronald Marquez, P. E.

Traffic Engineer

Date: May 7, 2018



**0076 University of California at Santa Cruz
Engineering and Traffic Survey**

Street:	Coolidge Drive	Prepared by	RJM
Limits:	High St. to Hagar Drive	Date:	5-7-2018

Factors

A. Prevailing Speed Data

Location of Survey	Midpoint		Midpoint	
	Northbound	Northbound	Southbound	Southbound
85th Percentile	33 mph		35 mph	
10 mph Pace	24 mph	33 mph	23 mph	32 mph
Percent in Pace	82		82	
Posted Speed Limit	25 mph		25 mph	

B. Collision History

Date Range	1/1/2015 to 12/31/2017		
Type	Total	Injury	PDO
Total	10	1	9

C. Traffic Factors

Average Daily Traffic	14,000
Length of Segment	2000 ft
Width of Segment	40 ft
Number of Travel Lanes	2 auto 2 bike
Adjacent Land Use	Entrance kiosk several minor intersections

D. Conditions Not Readily Apparent

Conditions	
Roadway Geometrics	Combined horizontal and vertical curvature
Comments	High bicycle usage and entrance activity

Survey Results

Posted Speed Limit	25 mph
Critical Speed *	35 mph
Reduction for Conditions Not Apparent	Curvature reduces sight distance and considerable side friction
Recommended Speed Limit	30 mph

* 85th percentile to the nearest 5 mph

Approved

Ronald Marquez, P. E.

Traffic Engineer

Date: May 7, 2018

