



Local Traffic Flow/ Long Range Planning Solutions Study

Project Report

January 25, 2019



VISION THAT MOVES YOUR COMMUNITY



TABLE OF CONTENTS

Executive Summary..... 1
Pass-through & Cut-through Traffic 1
Street Classifications & Transportation Impact Criteria 1
Proposed Street Classification Changes..... 2
Transportation Impact Criteria Recommendations 2
Existing Roadways & Traffic Patterns 3
Proposed Strategies & Improvements 5
Alameda De Las Pulgas/Atherton Avenue 5
Valparaiso Avenue 5
Middlefield Road 6
1. Traffic Analysis Overview 7
Study Intersections 7
Level of Service (LOS) Analysis Methodology 9
Significant Impact Criteria/Level of Service Standards (Proposed) 10
2. Existing Conditions 11
Street Classification System 11
General Street Design Standards 12
Bicycle & Pedestrian Master Plan Design Recommendations 12
Existing Roadway Network 13
Bicycle & Pedestrian Facilities on Local & Collector Streets 19
Existing Transit Service 19
Data Collection 22
Average Daily Traffic (ADT) Data 22
Intersection Turning Movement Counts (TMC) 25
Existing Signal Timing 25
Origin-Destination (OD) Data 25
Existing Conditions (2018) LOS & 95th Percentile Queue Length Analysis 29
Origin-Destination (OD) Analysis 34
3. Short-Term and Long-Term Recommendations 47



Alameda De Las Pulgas/Atherton Avenue47

Valparaiso Avenue49

Middlefield Road50

4. Street Classification Recommendations 51

 Purpose of Proposed Street Classification Changes51

 Complete Streets Act51

 Proposed Street Classification Changes52

 Proposed Functional Class Definitions52

 Recommended Changes to General Street Design Standards57

5. Transportation Impact Criteria Recommendations 58

 Current Town of Atherton Criteria for Transportation Impacts58

 SB 743 & Vehicles Miles Traveled (VMT)59

 Recommended Criteria59

 Vehicle Miles Traveled (VMT) Impacts59

 Bicycle and Pedestrian Impacts60

 Transit Impacts60

 Emergency Access Impacts60

 Recommended Intersection Level of Service (LOS) Goals60

Tables

Cut-through Traffic along Atherton Avenue5

Cut-through Traffic on Valparaiso Avenue6

Table 1: Signalized Intersection LOS Criteria9

Table 2: Unsignalized Intersection LOS Criteria 10

Table 3: Current Atherton Street Standards 12

Table 4: Average Daily Traffic Summary for Historical (2015) & Existing (2018) 23

Table 5: List of Schools within the Project Study Area 25

Table 6: Existing Conditions LOS & Delay 30

Table 7: Existing Conditions 95th Percentile Queue Lengths (ft.) 32

Table 8: Vehicle Trips Originating Outside of Atherton 35



Table 9: Cut-through Traffic along Atherton Avenue 47

Table 10: Cut-through Traffic on Valparaiso Avenue..... 49

Table 11: Arterial Street Guidelines (Proposed) 54

Table 12: Collector & Local Street Guidelines (Proposed) 55

Table 13: Proposed General Street Design Standards..... 57

Table 14: VMT Regional Criteria Example: City of San Francisco 60

Figures

Figure 1a: Vicinity Map..... 8

Figure 1b: Existing Street Classifications (Atherton)..... 16

Figure 1c: Existing Street Classifications (Atherton & Adjacent Jurisdictions) 17

Figure 1d: Existing & Proposed Bikeway Network..... 18

Figure 2: Average Daily Traffic Map..... 24

Figure 3: Existing Lane Geometry & Traffic Control 26

Figure 4: Existing Peak Hour Traffic Volumes..... 27

Figure 5: Existing Peak Hour Pedestrian & Bicycle Volumes..... 28

Figure 6: Origin, Destination, & Middle Filter Zones for OD Analysis..... 36

Figure 7: Preferred Route Choices from Origin Zone 1..... 37

Figure 8: Preferred Route Choices from Origin Zone 7..... 38

Figure 9: Preferred Route Choices from Origin Zone 8..... 39

Figure 10: Preferred Route Choices from Origin Zone 9 40

Figure 11: Preferred Route Choices from Origin Zone 11..... 41

Figure 12: Preferred Route Choices from Origin Zone 12..... 42

Figure 13: Preferred Route Choices from Origin Zone 14..... 43

Figure 14: Preferred Route Choices from Origin Zone 15..... 44

Figure 15: Proposed Street Classifications (Atherton) 56

Appendices

- Appendix A – Traffic Counts
- Appendix B – Origin-Destination Study Data
- Appendix C – Existing Conditions Synchro & SimTraffic Reports



EXECUTIVE SUMMARY

This study evaluates existing traffic operations and origin-destination (OD) patterns within the Town of Atherton, recommends short- and long-term measures for efficient circulation, smooth progression, improved operations, and safety for all modes of transportation including auto, pedestrian, and bicycles; and provides recommendations concerning changes to the town's transportation impact criteria and functional street classifications that guide street design priorities and standards.

PASS-THROUGH & CUT-THROUGH TRAFFIC

Primary focus of the traffic operations and OD assessment is the Town of Atherton's concern regarding pass-through and cut-through traffic impacting local circulation within the Town's roadway system. For purposes of this study:

- *Pass-through traffic* is defined as motor vehicle traffic that passes through Atherton by entering and exiting the town on the same street, relevant to regional streets such as El Camino Real, Middlefield Road or Alameda De Las Pulgas
- *Cut-through traffic* is defined as motor vehicle traffic that passes through Atherton via multiple streets including non-regional streets such as Atherton Avenue

STREET CLASSIFICATIONS & TRANSPORTATION IMPACT CRITERIA

Recommendations concerning updates to the town's street classifications and transportation impact criteria are relevant to these concerns, while also necessary for ensuring the town's concurrent *General Plan Circulation Element* update is consistent with recent State legislation including the California Complete Streets Act and Senate Bill (SB) 743.

- Atherton's current street classifications, and accompanying general street design standards, are described in the town's *General Plan Circulation Element* that was last updated in 2002, but focus entirely on the function of each street for purposes of accommodating motor vehicle travel. Existing street classifications in Atherton are described in Chapter 2, and illustrated on Figures 1b and 1c.
- Atherton's street classifications do not yet describe the role of each street for purposes of bicycle, pedestrian or transit travel, nor do the town's street and right-of-way standards include provision of bicycle lanes or pedestrian paths.
- Atherton's *Bicycle & Pedestrian Master Plan* (BPMP), adopted in 2014, recommended that the town's street classifications and accompanying general street design standards be updated to allow the types of improvements proposed by the BPMP, such as bicycle lanes and shoulder pedestrian paths on minor arterial and collector streets.
- In addition, as shown on Figure 1c: Atherton's current street classifications do not match that of adjacent jurisdictions for several key street. El Camino Real is classified as a highway by the Town of Atherton, but classified as a boulevard (major arterial) by the City of Menlo Park. Similarly, Valparaiso and Ravenswood Avenue are classified as collector streets by Atherton, while Menlo Park classifies both as minor arterials.



The General Plan Update thus provides an opportunity for Atherton to refine its functional street classifications and general street design standards to account for bicycle, pedestrian and transit travel. In recent years many cities and towns have modernized their street classifications to include specific multi-modal components, often by adding additional sub-classifications to each of the arterial-collector-local classifications, and specifying desired levels of pedestrian, bicycle, motor vehicle, and transit access for each classification and/or sub-classification.

- The Complete Streets Act adopted in 2008 requires that cities and other public agencies incorporate “Complete Street” components when updating their *General Plan Circulation Element* with an emphasis on making travel safe for all users, including bicyclists, pedestrians, motorists, transit vehicles, and people of all ages and abilities.
- SB 743 mandates that traffic level of service (LOS) will no longer an acceptable metric for evaluating traffic impacts under CEQA, to be replaced with metrics focusing on vehicle miles traveled (VMT) when fully implemented statewide (now anticipated by July 2020).

Proposed Street Classification Changes

Recommended changes to street classifications to incorporate are described in Chapter 4 of this report and illustrated on Figure 15. Key recommendations are:

- The definitions of each functional street classification would be updated to describe the role of each classification for serving all key modes of travel: bicycle, motor vehicle, pedestrian and transit. This would include defining the relative travel mode priorities for each classification, and identifying specific collector and local streets where school access would be prioritized.
- The general street design standards accompanying each street classification would be updated to incorporate complete street components, and allow the types of design treatments proposed in the Atherton Bicycle & Pedestrian Master Plan (adopted 2014), where relevant.
- The “freeway and highway” classification that is currently applied to El Camino Real would be eliminated and replaced with a new classification titled “boulevard”, consistent with the City of Menlo Park designation for El Camino Real and also supportive of the regional Grand Boulevard initiative. The “boulevard” classification would be defined as being a type of “primary arterial” street.
- The designation of both Valparaiso and Ringwood Avenues would be changed from collector to avenue (minor arterial), consistent with the classification of both streets by the City of Menlo Park.

Transportation Impact Criteria Recommendations

Recommendations concerning updated transportation impact criteria are described in Chapter 5 of this report. The town’s current criteria for determining the significance of environmental impacts under CEQA is limited to traffic operations criteria based on LOS (which must be replaced by VMT thresholds by July 2020), and the town has not yet adopted impact criteria relevant to determining the significance of impacts to bicycle, pedestrian or transit circulation. The recommend impact criteria language by transportation topic is shown below:



Vehicle Miles Traveled (VMT) Impacts: A project would result in potentially significant impacts to vehicle miles traveled (VMT) if project VMT per capita (i.e., per resident and/or per employee) would exceed 85 percent of existing VMT per capita for the region. *Note: each jurisdiction has discretion in selecting an appropriate "region" to define for purposes of defining a VMT impact threshold 15 percent below the selected regional average. The majority of cities, towns and counties in California have not yet adopted VMT criteria, and it may be advisable for the Town of Atherton to consult with other jurisdictions in San Mateo County prior to settling on a specific threshold.*

Bicycle and Pedestrian Impacts: Impacts to bicycle and pedestrian travel would be potentially significant if:

- A project would not provide adequate pedestrian or bicycle facilities to connect to the area circulation system; or
- Vehicles would cross pedestrian facilities on a regular basis without adequate design and/or warning systems, causing safety hazards; or
- Project design would cause increased potential for bicycle/vehicle conflicts; or
- A project would include elements that conflict with applicable bicycle and pedestrian policies.

Transit Impacts: Impacts to public transit would be potentially significant if:

- A project would generate a substantial increase in transit riders that cannot be adequately serviced by the existing transit services; or
- A project would generate demand for transit services in an area that is more than one-quarter mile from existing transit routes; or
- A project would include elements that conflict with applicable transit policies; or
- A project would cause a substantial increase in transit delays or transit operating costs such that significant adverse impacts in transit service levels could result

Emergency Access Impacts: Impacts would be potentially significant if a project were to result in inadequate emergency access.

EXISTING ROADWAYS & TRAFFIC PATTERNS

This report contains a comprehensive summary of the existing roadway infrastructure, traffic patterns and operations within the Town, described in Chapters 1 and 2. Methods used for existing conditions analysis include data collection, evaluation of existing roadway infrastructure, OD analysis to understand existing traffic patterns within the Town of Atherton's roadway network, and development of traffic simulation models using Synchro/SimTraffic software to report existing level of service (LOS), delay, and 95th percentile queue lengths at selected study intersections. The following sections of the report explain the analysis methodology and results in detail. Data collected for the analyses and traffic simulation model outputs are provided in the Appendices.

Average daily traffic (ADT) and intersection turning movement counts (TMC) were collected for existing conditions analysis during a typical weekday with normal weather conditions and when schools were in session. Additionally, the StreetLight Insight® data platform, which utilizes big data, was used for OD



analysis. The OD analysis was conducted using eight origin/destination zones and nine middle filter zones resulting in 640 route choices evaluated as a part of the study to determine traffic behavior within the study area.

Existing roadway network and results of the analyses conducted show that El Camino Real (a state highway that operates as a major arterial) and minor arterials Alameda De Las Pulgas and Middlefield Road provide intercity connectivity to and through the Town, consistent with their intended purpose as defined by the town's adopted street classification definitions, and run parallel to US 101, which is generally congested during peak hours of travel and are currently at capacity. This results in diversion of traffic from the freeway on to the Town streets and arterials and vice versa indicating pass through and cut-through traffic. The results show that majority of the trips captured at the origin zones were pass through trips, along Alameda De Las Pulgas (approximately 89%), El Camino Real (approximately 86%), and Middlefield Road (approximately 56%). The highest amount of pass through trips were observed on El Camino Real, and the highest amount of diversion or cut-through from one major thoroughfare to another was observed along Middlefield Road.

The traffic operations analysis evaluated 12 intersections for existing LOS, motor vehicle delay, and 95th percentile queue lengths. Based on the analysis conducted, it was observed that most of the study intersections do not operate with acceptable LOS thresholds per the Town's currently proposed LOS standards described in the *Draft Circulation Element* update prepared in January 2018.

With the exception of Valparaiso Avenue/University Drive, all of the study intersections are unsignalized. The unacceptable LOS and delay at these intersections during peak commute hours indicate the inability of the vehicles on side streets, and conflicting left-turn movements on major streets, to safely find a gap and navigate amidst the heavily used arterials. This is prominently observed along Middlefield Road, which harbors unsignalized intersections with one-way or two-way stop control on the side streets with Middlefield Road remaining uncontrolled. TJKM conducted peak hour signal warrant analysis at all study intersections to ascertain where installation of traffic signal is warranted. The following intersections met the peak hour traffic signal warrant analysis.

1. Alameda De Las Pulgas/Atherton Avenue
2. Valparaiso Avenue/Emilie Avenue
3. Valparaiso Avenue/Elena Avenue
4. Middlefield Road/Fair Oaks Lane-Palmer Lane
5. Middlefield Road/Watkins Avenue



PROPOSED STRATEGIES & IMPROVEMENTS

Based on the analysis conducted under Existing Conditions, the following short- and long-range strategies and potential physical improvements were identified as described in Chapter 3, to improve mobility, safety and traffic conditions at selected study intersections:

Alameda De Las Pulgas/Atherton Avenue

Alameda De Las Pulgas experiences 89% & 60% southbound (SB) & northbound (NB) pass-through traffic respectively averaged over all peak periods. The a.m. and p.m. peak direction of travel is SB and NB respectively with stop-and-go traffic conditions during the a.m. peak hour with limited gaps for conflicting left-turns on major street and side-street left-turn movements. Alameda De Las Pulgas/Atherton Avenue acts as the controlling intersection along Atherton Avenue. This intersection operates at LOS F during all peak periods and meet peak hour signal warrants. Atherton Avenue experiences cut-through traffic between Alameda De Las Pulgas and El Camino Real as provided on table below:

Cut-through Traffic along Atherton Avenue

<i>Direction</i>	<i>AM</i>	<i>School PM</i>	<i>PM</i>
EB	19% (92)	6% (20)	12% (37)
WB	13% (97)	10% (67)	15% (153)

Note: Percentage % (No. of Vehicles)

TJKM proposes the following recommendations at this intersection to improve operations and reduce cut-through and pass-through traffic along the corridor.

1. Provide Left-Turn restrictions from Alameda De Las Pulgas onto Stockbridge Avenue and Polhemus Avenue during the a.m. peak period.
2. Signalization of Alameda De Las Pulgas/Atherton Avenue.
3. Square-out intersection by removing existing pork-chop and adding an exclusive right-turn lane making it safer for all modes of transportation.
4. Provide protected left-turn phasing along Alameda De Las Pulgas with westbound right-turn overlap for Atherton Avenue.
5. Metering traffic upon signalization to deter pass-through traffic.

With the signalization of Alameda De Las Pulgas/Atherton Avenue, the intersection operates at LOS C during all peak periods. Possibility of installing a roundabout was also analyzed at the intersection but due to right-of way (ROW) constraints and need of property acquisition this would not be a viable option at this time.

Valparaiso Avenue

Valparaiso Avenue connects Alameda De Las Pulgas to El Camino Real. The peak direction of travel during the a.m. and p.m. peak period is eastbound and westbound direction respectively with stop-and-go traffic conditions during the a.m. peak period with limited gaps for conflicting left-turns on major street and side-street left-turn movements.



This corridor experiences cut-through traffic from El Camino Real and Alameda De Las Pulgas. The cut-through traffic percentage along this corridor is provided on table below.

Cut-through Traffic on Valparaiso Avenue

Direction	AM	School PM	PM
EB	13% (138)	18% (170)	6% (50)
WB	26% (188)	15% (161)	8% (73)

Note: Percentage % (No. of Vehicles)

The intersections of Valparaiso Avenue/Emilie Avenue and Valparaiso Avenue/Elena Avenue operate with LOS F during all study peak periods. These intersections meet peak hour signal warrants, but for the intersections to operate at acceptable level of service exclusive left-turn lanes have to be provided along with the signalization at the intersections which would require ROW take. Due to ROW constraints this would not be a viable option at this time. TJKM also evaluated a one-way circulation loop between Elena Avenue and Emilie Avenue although Town may need to work with City of Menlo Park analyze the intersection of Alameda De Las Pulgas/Valparaiso Avenue and provide turn restrictions.

Middlefield Road

Middlefield Road experiences 56% & 60% southbound (SB) & northbound (NB) pass-through traffic respectively averaged over all peak periods. The a.m. and p.m. peak direction of travel is SB and NB respectively with stop-and-go traffic conditions during the a.m. peak hour with limited gaps for conflicting left-turns on major street and side-street left-turn movements. Intersection of Middlefield Road/Fair Oaks Lane, Middlefield Road/Marsh Road and Middlefield Road/Oak Grove Avenue acts as the controlling intersection along this corridor. These intersections operates at LOS F during all peak periods. Intersection of Middlefield Road/Fair Oaks Lane and Lane Middlefield Road/Watkins Avenue are unsignalized intersections along the corridor and meet peak hour signal warrant analysis.

TJKM proposes the following recommendations along Middlefield Road to improve operations and reduce cut-through and pass-through traffic along the corridor.

1. Signalization of Middlefield Road/Fair Oaks Lane and Middlefield Road/Watkins Avenue.
2. Improve signal timings along Middlefield Road by updating the coordination plans through the corridor.
3. Provide Northbound Left-Turn restrictions from Middlefield Road onto Glenwood Avenue during the a.m. peak period
4. Meter the traffic along the corridor at controlling intersections like Middlefield Road/Fair Oaks Lane, Middlefield Road/Marsh Road and Middlefield Road/Oak Grove Avenue to deter pass-through as well as cut-through traffic.



1. TRAFFIC ANALYSIS OVERVIEW

The town is concerned with the impact of cut-through and pass-through traffic on the streets in Atherton during the peak travel periods (weekday a.m., school p.m., and p.m. peak periods). This includes both pass-through regional traffic on Atherton's arterial and collector streets, as well as cut-through traffic on local residential streets. The objective of the evaluation includes improving throughput through the arterials while reducing the effect of cut-through traffic, identifying short-range and long-range strategies and improvement options at key locations, updating the Town's significance criteria for evaluating transportation impacts, and providing recommendations for the Town's street classifications for the 2018 Circulation Element update.

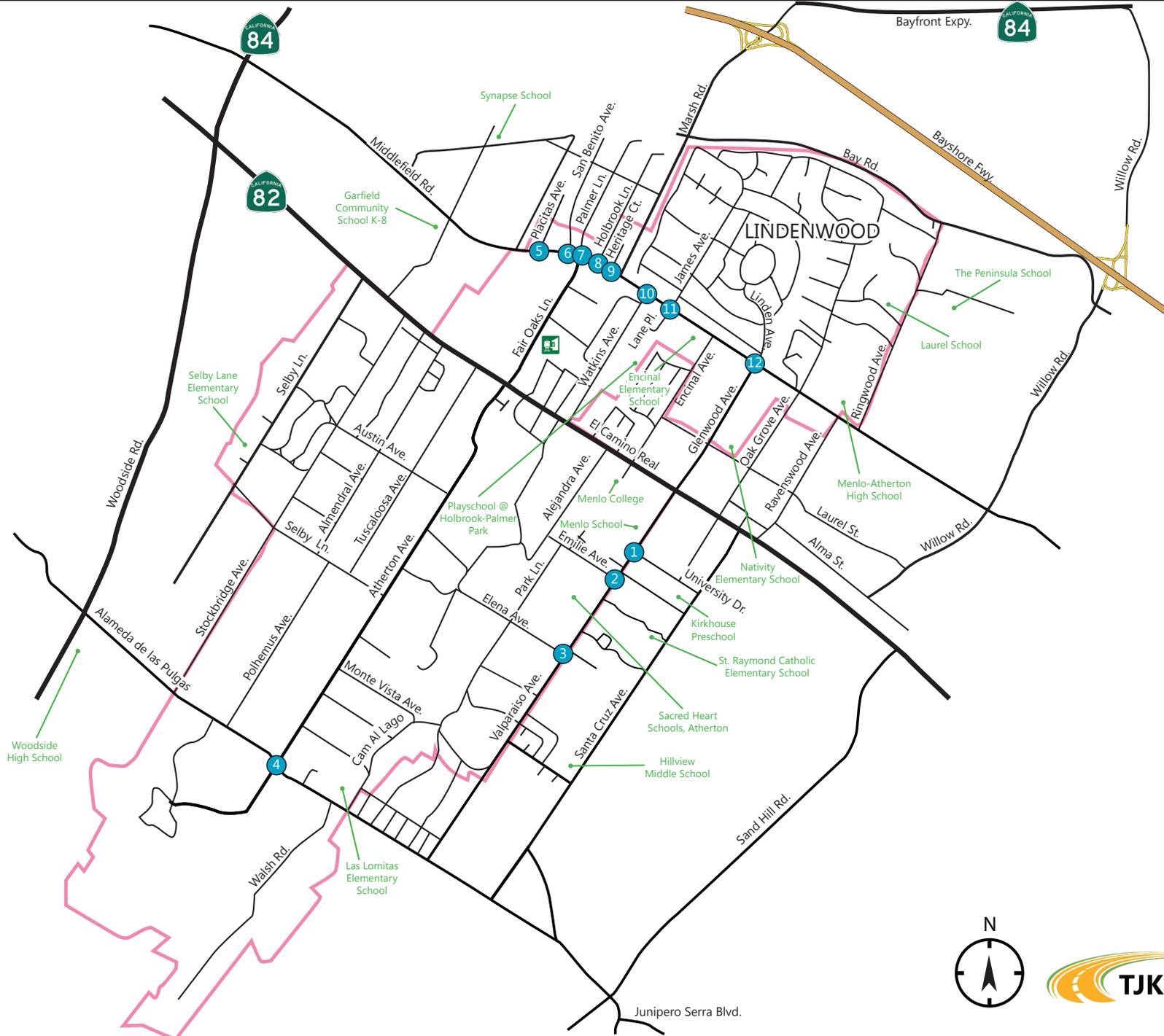
As a part of the study, TJKM collected intersection TMC at key study locations, ADT counts for focused roadways within the Town, and an OD study to ascertain the impacts of potential cut-through traffic within Atherton. This report summarizes the data collected, results of the existing conditions analysis, including LOS and delay and 95th percentile queue lengths at each study intersection, and the Existing Conditions OD analysis conducted.

STUDY INTERSECTIONS

The study intersections selected for the project are listed below and illustrated in **Figure 1a**.

- Valparaiso Avenue/University Drive (Signalized)
- Valparaiso Avenue/Emilie Avenue (One-Way Stop Control)
- Valparaiso Avenue/Elena Avenue (One-Way Stop Control)
- Alameda De Las Pulgas/Atherton Avenue (All-Way Stop Control)
- Middlefield Road/Placitas Avenue (One-Way Stop Control)
- Middlefield Road/San Benito Avenue (One-Way Stop Control)
- Middlefield Road/Fair Oaks Lane-Palmer Lane (Two-Way Stop Control)
- Middlefield Road/Holbrook Lane (One-Way Stop Control)
- Middlefield Road/Heritage Court (One-Way Stop Control)
- Middlefield Road/Watkins Avenue (One-Way Stop Control)
- Middlefield Road/James Avenue-Lane Place (Two-Way Stop Control)
- Middlefield Road/Glenwood Avenue-Linden Avenue (Two-Way Stop Control)

Vicinity Map



LEGEND

-  Study Intersection
-  Town Limit
-  Schools
-  Caltrain





LEVEL OF SERVICE (LOS) ANALYSIS METHODOLOGY

LOS is a standard measure of traffic service along a roadway or at an intersection. It ranges from A to F, with LOS A being best and LOS F being worst. In very general terms, LOS A, B, and C indicate conditions where traffic can move relatively freely. LOS D describes conditions where delay is more noticeable and average travel speeds are more unstable. LOS E indicates significant delays and average travel speeds vary greatly and are unpredictable; traffic volumes are generally at, or close to, capacity. Finally, LOS F characterizes traffic flow at very slow speeds (stop-and-go) and significant delays with queuing at unsignalized intersections, which typically means traffic demand on the roadway exceeds the roadway's capacity.

The *Highway Capacity Manual (HCM), 6th Edition* is the standard reference published by the Transportation Research Board, and contains the specific criteria and methods to be used in assessing LOS. There are several software packages that have been developed to implement HCM. In this study, Synchro Software was used to calculate the LOS at the study intersections.

Signalized intersection LOS is based on the capacity of the intersection as a whole and average delay experienced by a driver. Unsignalized intersection LOS is defined by the average delay experienced by a driver for the minor approach worst movement or major approach critical movement. **Tables 1** and **2** provide the relationship between LOS rating and delay for signalized and unsignalized intersections respectively.

Table 1: Signalized Intersection LOS Criteria

Level of Service	Description	Average Control Delay (Seconds Per Vehicle)
A	Operations with very low delay occurring with favorable progression &/or short cycle lengths.	≤ 10.0
B	Operations with low delay occurring with good progression &/or short cycle lengths.	10.1 to 20.0
C	Operations with average delays resulting from fair progression &/or longer cycle lengths. Individual cycle failures begin to appear.	20.1 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, &/or high volume-to-capacity (V/C) ratios. Many vehicles stop & individual cycle failures are noticeable.	35.1 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths & high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.1 to 80.0
F	Operation with delays unacceptable to most drivers occurring due to oversaturation, poor progression, or very long cycle lengths.	> 80.0

Source: Transportation Research Board, 2000 Highway Capacity Manual



Table 2: Unsignalized Intersection LOS Criteria

Level of Service	Description	Average Control Delay (Seconds Per Vehicle)
A	Little or no delays	≤ 10.0
B	Short traffic delays	10.1 to 15.0
C	Average traffic delays	15.1 to 25.0
D	Long traffic delays	25.1 to 35.0
E	Very long traffic delays	35.1 to 50.0
F	Extreme traffic delays with intersection capacity exceeded (for an all-stop), or with approach/turn movement capacity exceeded (for a side street stop controlled intersection)	> 50.0

Source: Transportation Research Board, 2000 Highway Capacity Manual

Significant Impact Criteria/Level of Service Standards (Proposed)

Currently, the Town of Atherton has proposed adoption of the following minimum acceptable intersection LOS standards (not yet adopted) as part of the General Plan update:

- Highways will operate at a minimum LOS E (C/CAG adopted standard)
- Minor arterials and collector streets will operate at a minimum LOS D
- Local Streets will operate at a minimum LOS C



2. EXISTING CONDITIONS

STREET CLASSIFICATION SYSTEM

The Atherton *General Plan* defines the functional street classification system for each type of street. The town's current street classifications are focused entirely on the function of each street for purposes of accommodating motor vehicle travel, but do not yet describe the function of each street for purposes of bicycle, pedestrian or transit travel. Atherton's current street classifications and right-of-way standards do not require provisions for bicycle, pedestrian or transit circulation or access. Updating the *General Plan* street design standards to accommodate bicycle lanes, and adopting a more rigorous policy for pedestrian accommodation were among the policy recommendations contained in the Atherton *Bicycle and Pedestrian Master Plan* (BPMP) adopted in 2014.

The roads in the town of Atherton are currently divided into four classifications, highways, minor arterial streets, collector streets, and local streets as described below. The 2002 *Atherton General Plan* specified that no street under town jurisdiction shall have more than two travel lanes.

Freeways and Highways are defined by the Atherton *General Plan* as "multilane facilities with no fixed interruptions to traffic flow" (i.e., no traffic signals or stop signs). The adopted 2002 *General Plan* further states that freeways and highways should provide capacity to serve a traffic volume of over 50,000 daily vehicles. Currently, there are no freeways in the Town of Atherton. El Camino Real, which is under Caltrans jurisdiction and passes through the town, is classified as a highway by the town, which is now an out-of-date definition since traffic signals have been installed at multiple intersections on El Camino Real, while the existing daily traffic volume on El Camino Real within Atherton is less than 40,000 daily vehicles (well under the desired capacity identified by the Atherton *General Plan*).

Minor Arterials are defined by the Atherton *General Plan* as "streets with traffic signals that serve through traffic and provide access to abutting properties (such as residential and commercial sites) as a secondary function". The Atherton *General Plan* defines a desired capacity of 10,000 to 25,000 daily vehicles for Minor Arterials. Middlefield Road, Marsh Road and Alameda de las Pulgas are classified as Minor Arterials (although no traffic signals are provided on Alameda de las Pulgas within Atherton). Traffic volumes on each of Atherton's minor arterials are generally within the desired range identified by the *General Plan*. In the Town of Atherton, minor arterials also serve as emergency service and evacuation routes.

Collector Streets are defined by the Atherton *General Plan* as being streets that "provide land access and traffic circulation within residential areas". (In other cities, collectors also serve non-residential areas). The *General Plan* further states that "collector streets should be designed to carry through traffic", while their main purpose "is to connect local traffic generators and local streets to arterials". The *General Plan* identifies a desired capacity of up to 12,000 daily vehicles on collector streets.

Local Streets are defined by the *General Plan* as providing access to abutting properties, locations for easements, access to open space, and fire breaks between buildings. The *General Plan* specifies that carrying traffic is a secondary function of local streets, and that local streets should be designed to



discourage through traffic. The General Plan identifies a desired daily volume of less than 1,000 daily vehicles on local streets.

General Street Design Standards

The general standards for street and right-of-way improvements as described in the adopted 2002 Atherton General Plan *Circulation Element* are summarized on **Table 3** below.

Table 3: Current Atherton Street Standards

Functional Classification	Right-of-Way Width	Roadway Width	Number of Motor Vehicle Lanes	Pedestrian Path Width	Bicycle Lane included?	Desired Traffic Capacity (ADT)
Freeways and Highways	Not specified	Not specified	4 to 10	Not specified	No	>50,000 daily vehicles
Minor Arterial	60 feet	24 feet	2	Not specified	No	10,000 to 25,000
Collector	50 feet	24 feet	2	Not specified	No	2,500 to 12,000
Local	40 feet	20 feet	2	Not specified	Not applicable	<1,000

Source: Atherton General Plan 2002

Bicycle & Pedestrian Master Plan Design Recommendations

The BPMP, adopted by the town in 2014, contained bikeway design recommendations and pedestrian walkway concepts that differ from the town’s minimum street design standards, including:

- BPMP recommended increasing the minimum roadway width on minor arterial and collector streets from 24 to 32 feet on streets where bicycle lanes are provided or proposed. This would apply to all of town’s minor arterial streets (Alameda De Las Pulgas and Middlefield Avenue), and some collector streets (Atherton Avenue and Valparaiso Avenue).
- BPMP recommends updating the General Plan to require pedestrian accommodations (such as adjacent pedestrian paths or shoulder pathways) on all minor arterial and collector streets.



EXISTING ROADWAY NETWORK

The existing functional street classifications for highways, minor arterials and collector streets within the Town are illustrated in **Figure 1b**. All other streets within Atherton are designated as local streets.

The regional context of Atherton's street classifications are highlighted in **Figure 1c**, which shows the equivalent street classifications of adjacent jurisdictions, which differs from Atherton designations in some cases. For example:

- Valparaiso and Ravenswood Highway are classified as collector streets by the Town of Atherton, and as minor arterials by the City of Menlo Park.
- El Camino Real is classified as a highway by the Town of Atherton, and as a boulevard (major arterial) by the City of Menlo Park.

Existing and proposed bikeways as identified in the BPMP (adopted in 2014) are illustrated on **Figure 1d**. Under existing conditions, bicycle lanes within Atherton are provided on Alameda De Las Pulgas, Middlefield Road, Valparaiso Avenue and a portion of Selby Lane. The BPMP proposes provision of a Class I Trail along the west side of El Camino Real that would accommodate both bicyclists and pedestrians, and installation of Class II bicycle lanes on Valparaiso Avenue and additional segments of Selby Lane. In addition, the BPMP proposes Class III bikeway designations on several local streets, and proposes enhancements to the existing bicycle lanes on Alameda De Las Pulgas, Middlefield Road and Valparaiso Avenue.

Streets in Atherton generally do not follow a true north-south or east-west alignment. For the purpose of this study, El Camino Real and US 101 are both considered to have a north-south alignment. The alignment designation of all other streets was established based on the street's relative position to US 101 and/or El Camino Real. Following are descriptions of regional routes in the project vicinity.

El Camino Real (State Route (SR) 82) is a primary north-south regional street that functions as a major arterial, is designated as a highway by the Town of Atherton and as a boulevard (major arterial) by the City of Menlo Park, and serves a key north-south commercial and mixed-use corridor in the San Francisco Peninsula. El Camino Real is one of the routes included in the San Mateo County Smart Corridor project, an Intelligent Transportation System program designed to improve mobility along the US 101 corridor (including parallel routes) in San Mateo County. Within the study area, El Camino Real has three vehicle lanes in northbound and southbound direction from Spruce Avenue to Selby Lane, and two vehicle lanes in northbound and three vehicle lanes in southbound direction between Valparaiso Avenue-Glenwood Avenue and Spruce Avenue within the town's limits. The segment between Selby Lane to Valparaiso Avenue-Glenwood Avenue is separated by concrete median. The street has a posted speed limit of 35 miles per hour (mph) within Atherton. As a regional route, El Camino Real begins in Santa Clara County and continues through Daly City where it continues as Mission Street into San Francisco. El Camino Real passes through the jurisdictions of Menlo Park, Atherton, Palo Alto, Redwood City, and various other jurisdictions including Santa Clara County and San Mateo County.



There are no existing bicycle lanes or designated bicycle route segments on El Camino Real within the town's limits. The BPMP proposes removal of one southbound motor vehicle lane to provide a Class I Trail along the west side of El Camino Real that would also accommodate pedestrians. Frequent bus service is provided on El Camino Real by SamTrans. Sidewalks are provided on the east side of El Camino Real from Alejandra Avenue to Watkins Avenue, within town limits, and from Wilburn Avenue to Selby Lane, directly outside of the town border in the North Fair Oaks area. No sidewalks are provided on the west side of El Camino Real within the town limits. On-street parking is permitted along certain segments of El Camino Real in the northbound direction only directly adjacent to town limits, in the North Fair Oaks unincorporated area.

Middlefield Road is a north-south minor arterial with a posted speed limit of 30 mph that extends from Redwood City south through Atherton, Menlo Park and Palo Alto to Mountain View. Middlefield Road has two through lanes per direction both north and south of Atherton. Within Atherton, Middlefield Road narrows to one through motor vehicle lane in each direction between the Redwood City/Atherton border and Ringwood Avenue, before widening to two lanes in each direction south of Ringwood Avenue. Middlefield Road provides direct access to residential, office, school areas, and Redwood City and Menlo Park commercial developments. The southbound segment from Ringwood Avenue to Ravenswood Avenue falls under the jurisdiction of Menlo Park and all other segments within the town limits fall under the Town of Atherton's jurisdiction. Middlefield Road, within town limits, has Class II bike lanes in both directions. Middlefield Road has sidewalks on both sides from Ringwood Avenue to Ravenswood Avenue, with the east side within town limits and the west side in Menlo Park, and on the east side only from Ravenswood Avenue to Oak Grove Avenue and from Encinal Avenue to Marsh Road. There is currently no on-street motor vehicle parking on Middlefield Road.

Atherton Avenue is an east-west collector street and extends between Ridgeview Drive and El Camino Real. Atherton Avenue has one through lane in each direction. Atherton Avenue connects to Middlefield Road via Fair Oaks Lane. The posted speed limit is 25 to 35 mph. Class III bicycle route signage is provided in both directions from Alameda de Las Pulgas to El Camino Real. There are no existing sidewalks on this roadway. On-street parking is permitted in both directions from Alameda De Las Pulgas to El Camino Real.

Alameda De Las Pulgas is a north-south minor arterial which extends from north of Redwood City to south of Atherton at Sand Hill Road, including segments between Camino Al Lago and Stockbridge Avenue within the Town of Atherton. Alameda De Las Pulgas has one through motor vehicle lane in each direction and school bus service provided by SamTrans. The posted speed limit is 30 mph. Class II bicycles lanes are provided from Stockbridge Avenue to Camino al Lago in both directions. There are no existing sidewalks for this roadway segment. On-street parking is currently not allowed within the town limits.

Ravenswood Avenue is an east-west street connecting El Camino Real and Middlefield Road, designated as an avenue (minor arterial) by the City of Menlo Park and as a collector by the Town of Atherton. Ravenswood Avenue has one motor vehicle lane in each direction with a posted speed limit of 30 mph, and provides direct access to both commercial and residential uses. The eastbound segment of Ravenswood Avenue falls under Menlo Park's Jurisdiction while the westbound falls under the Town of Atherton. Class II bicycle lanes and Class III bicycle route designations are provided in both directions



from El Camino Real to Middlefield Road within town limits. Sidewalks are provided on the south side from El Camino Real to Middlefield Road, and on portions of the north side within Menlo Park from El Camino Real to Marcussen Drive and El Camino Real to Merrill Street. There is no on-street parking permitted on Ravenswood Avenue.

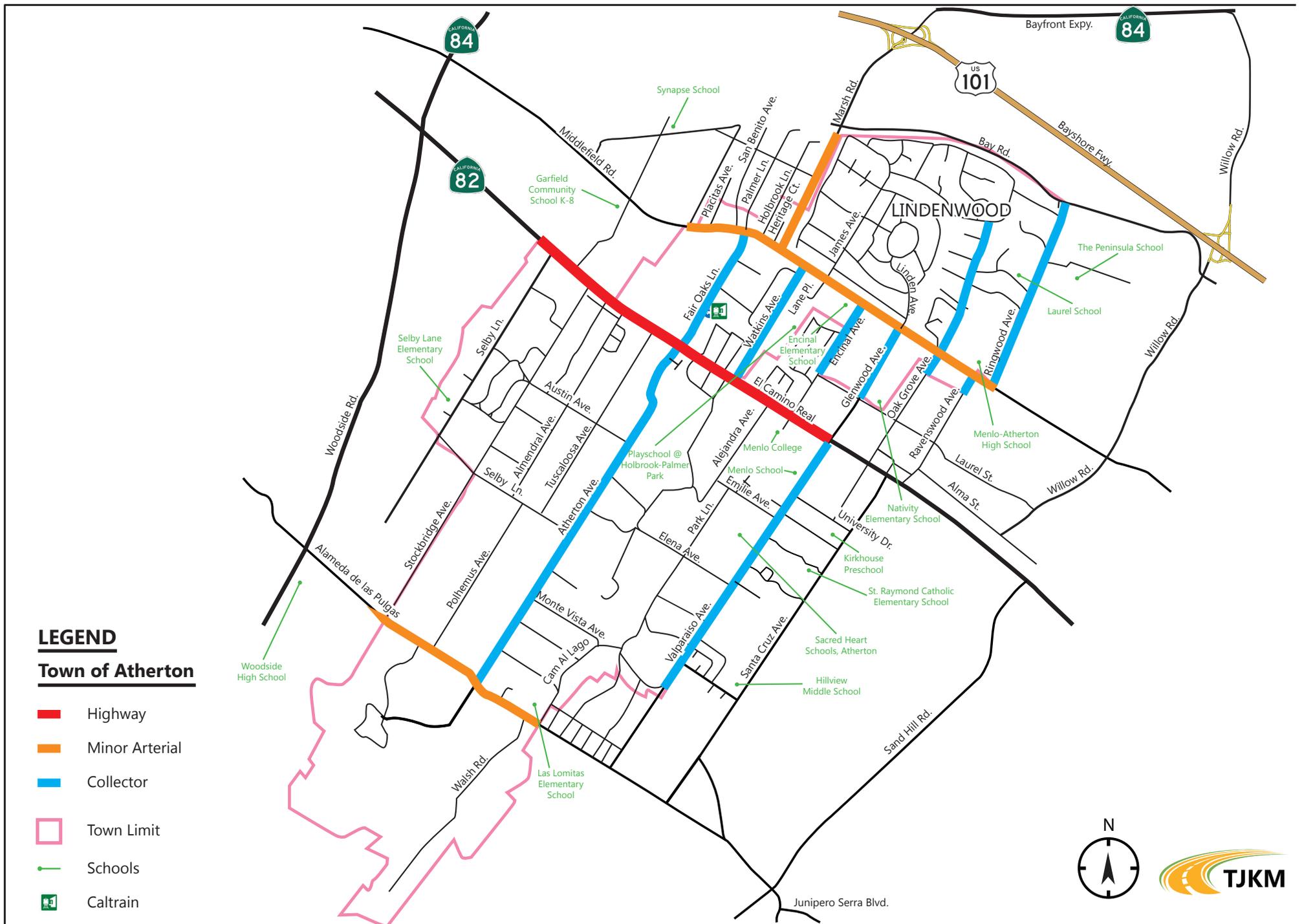
Ringwood Avenue is an east-west collector between Middlefield Road and the Bay Road. Ringwood Avenue has one motor vehicle lane in each direction with a posted speed limit of 30 mph. The eastbound direction of Ringwood Avenue is under San Mateo County's jurisdiction and the westbound direction is under the Town of Atherton's jurisdiction. Class II bicycle lanes are provided in the eastbound direction from Middlefield Road to Arlington Way and in both directions from Arlington Way to Bay Road. Sidewalks are provided on both sides from Middlefield Road to Arlington Way and on the south side from Edge Road to Colby Avenue. Street parking is limited on westbound Ringwood Avenue from Arlington Way to Edge Road.

Marsh Road is an east-west two-to-four lane minor arterial between Middlefield Road in the Town of Atherton and US 101/Bayfront Expressway interchange in City of Redwood City, and connects with Bayfront Expressway (State Route 84) which provides access to portions of Menlo Park and East Palo Alto before connecting with the Dumbarton Bridge. It also provides access to the North Fair Oaks neighborhood of San Mateo County via Fair Oaks Avenue. The segment from Middlefield Road to south of Fair Oaks Avenue falls under the jurisdiction of the Town of Atherton, while the segment from Fair Oaks Avenue to Bay road falls under the jurisdiction of the North Fair Oaks unincorporated area. The westbound segment of Marsh Road from Fair Oaks Avenue to Bay Road falls under San Mateo County's jurisdiction. The posted speed limit is 30 mph. There are currently no bicycle facilities on Marsh Road. Sidewalks are provided for westbound pedestrians from Fair Oaks Avenue to Bay Road. Street Parking is permitted from Fair Oaks Avenue to Bay Road in the westbound direction, outside of town limits. Street parking is not permitted on Marsh Road within the Town of Atherton.

Valparaiso Avenue is an east-west street between North Lemon Avenue and El Camino Real that is designated as a collector street by the Town of Atherton, and as an avenue (minor arterial) by the City of Menlo Park. Valparaiso Avenue has one motor vehicle lane in each direction with a posted speed limit of 35 mph. The westbound segment from North Lemon Avenue to El Camino Real falls under the jurisdiction of the Town of Atherton while the eastbound segment falls under the jurisdiction of Menlo Park. Class II bicycle lanes are provided from North Lemon Avenue to El Camino Real in both directions. Sidewalks are provided on the south side (under Menlo Park's jurisdiction) from North Lemon Avenue to El Camino Real. On-street parking is permitted in the eastbound direction but is limited in the westbound direction from North Lemon Avenue to El Camino Real.

Fair Oaks Lane is a two-lane collector street that connects El Camino Real with Middlefield Road and provides access to the Atherton Caltrain Station. Fair Oaks Lane also connects to Alameda De Las Pulgas via Atherton Avenue and provides connectivity to the Town of Atherton's Civic Center. The posted speed limit is 25 mph. Fair Oaks Lane has existing Class III bicycle route signage but no sidewalks provided for pedestrians despite providing access to Atherton's Caltrain station. On-street parking is permitted in the westbound direction but limited in the eastbound direction.

Existing Street Classifications (Atherton)



LEGEND

Town of Atherton

- █ Highway
- █ Minor Arterial
- █ Collector
- Town Limit
- Schools
- Caltrain



Existing Street Classifications (Atherton and Adjacent Jurisdictions)

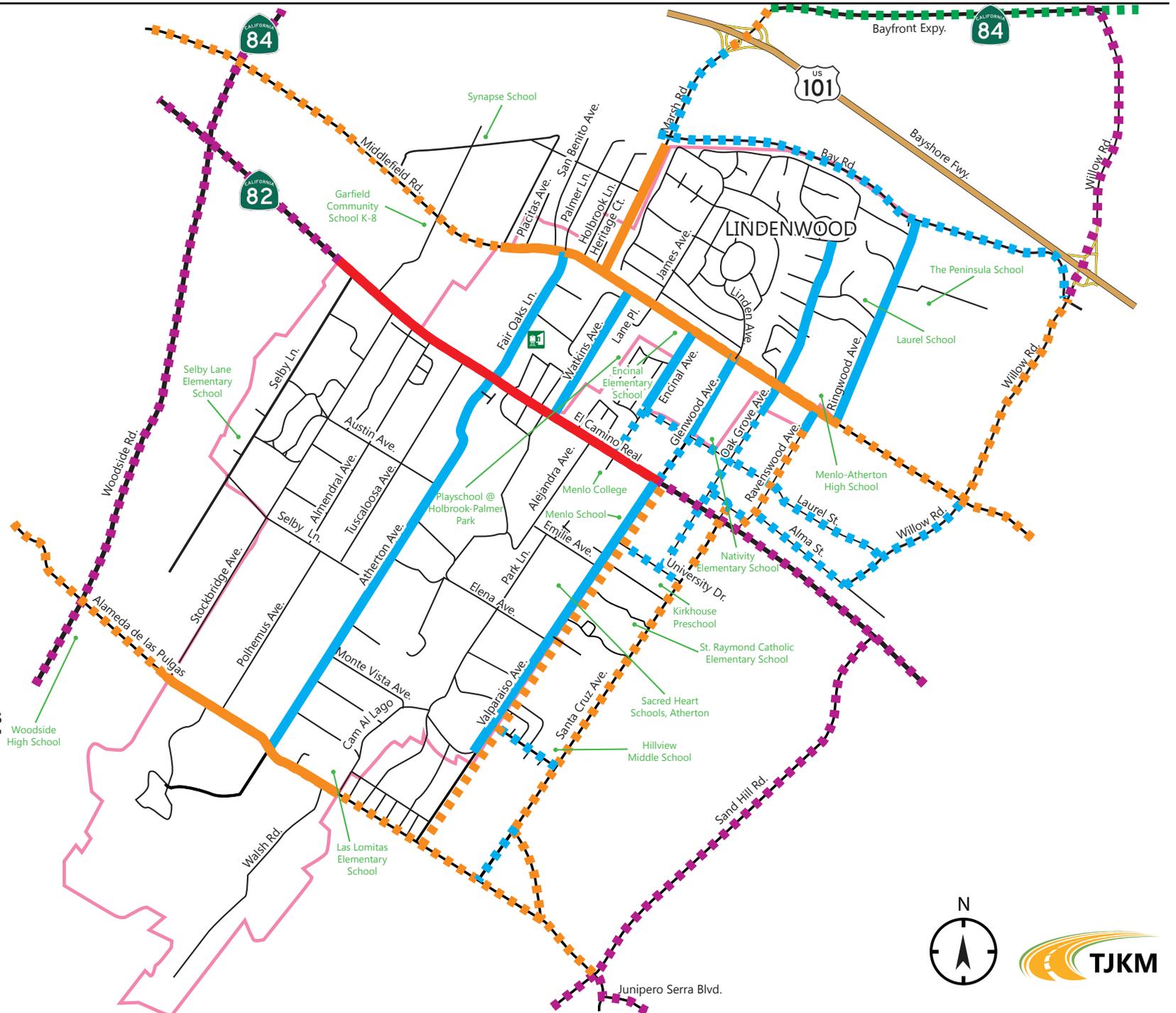
LEGEND

Town of Atherton

- █ Highway
- █ Minor Arterial
- █ Collector

Adjacent Jurisdictions

- █ Expressway
- █ Major Arterial
- █ Minor Arterial
- █ Collector
- Town Limit
- Schools
- Caltrain





BICYCLE & PEDESTRIAN FACILITIES ON LOCAL & COLLECTOR STREETS

This section describes other bicycle and dedicated pedestrian facilities on Atherton's smaller local and collector streets network.

Selby Lane has Class II bicycle lanes in both directions from El Camino Real to Oakwood Boulevard and Class III bicycle facilities in both directions from Oakwood Boulevard to Atherton Avenue. Selby Lane currently has no existing dedicated pedestrian facilities.

Austin Avenue is designated as a Class III bikeway from Selby Lane to Atherton Avenue in both directions. There are currently no existing dedicated pedestrian facilities on Austin Avenue.

Camino Al Lago/Park Lane has Class III bicycle facilities in both directions from Alameda de Las Pulgas to Emilie Avenue and has no existing dedicated pedestrian facilities.

Elena Avenue has existing Class III bicycle facilities from Atherton Avenue to Valparaiso Avenue in both directions. There are no existing dedicated pedestrian facilities along Elena Avenue.

Emilie Avenue has Class III facilities in both directions from Alejandra Avenue to Valparaiso Avenue. There is a sidewalk along the Sacred Heart School soccer field on the west side of Emilie Avenue from Park Lane to MacBain Avenue.

Alejandra Avenue has Class III bicycle facilities in both directions from Emilie Avenue to El Camino Real. Alejandra Avenue has a sidewalk on the south side from Menlo College Tennis Courts to Cartan Athletic Fields.

Dinkelspiel Station Lane has Class III bicycle facilities running from Fair Oaks Lane to Watkins Avenue in both directions. On the west side, there is a sidewalk from Ashfield Road to Maple Avenue.

Watkins Avenue has Class III bicycle facilities in both directions from El Camino Real to Middlefield Road. There is currently a sidewalk on the east side of Watkins Avenue near the El Camino Real/Watkins Avenue intersection and from the Watkins Avenue Caltrain grade crossing to Middlefield Road.

Encinal Avenue has Class II bicycle lanes from Laurel Street to Middlefield Road in both directions. There is a sidewalk in the westbound direction from Middlefield Road to the west end of the Menlo Park City School District.

Bay Road has Class II bicycle lanes in both directions from Marsh Road to Ringwood Avenue. In the northbound direction, there is a sidewalk present from Marsh Road to Del Norte Avenue.

EXISTING TRANSIT SERVICE

The public transit network within San Mateo County is primarily comprised of SamTrans bus service and Caltrain passenger rail service between Santa Clara County and San Francisco, including service to the Atherton, Menlo Park and Redwood City Caltrain stations. Service to the Atherton Station is currently limited to weekends only. Caltrain serves over 65,000 average weekday passengers, most of whom pass through Atherton, helping to alleviate regional cut-through traffic. There are two at-grade road crossings of the Caltrain tracks in Atherton; one on Fair Oaks Lane and the other on Watkins Avenue.



SamTrans operates fixed bus routes through Atherton, providing public bus access throughout San Mateo County and into San Francisco and Palo Alto. The principal SamTrans line runs along El Camino Real, providing connecting service to Peninsula transit stations between Palo Alto and Daly City including the Redwood City and Menlo Park Caltrain Stations. Other lines run on Middlefield Road and Bay Road. Service is available to local elementary and high schools on school-days, including service on Alameda de las Pulgas.

SamTrans also operates the Menlo Park Caltrain Shuttle which provides service through Atherton between the Menlo Park Caltrain Station and the Bohannon Industrial Park east of Atherton.

There are eight active bus routes within the Town, as described below.

Route 87: Route 87 is active during school days only. The eastbound route is active in the morning between 7:00 a.m. and 7:35 a.m. going to Woodside High School from Portola Valley. The westbound route leaving Woodside High School is active between 12:15 p.m. and 12:51 p.m. and between 2:20 p.m. and 2:56 p.m. on Wednesdays, and between 3:25 p.m. and 4:01 p.m. on all weekdays except Wednesdays. Within the Town of Atherton, bus stops are located at Alameda de las Pulgas/Polhemus Avenue, Alameda de las Pulgas/Atherton Avenue, Alameda de Las Pulgas/ Walsh Road, Alameda de las Pulgas/Manzanita Avenue, and Alameda de las Pulgas/Valparaiso Avenue.

Route ECR: Route ECR is active on weekdays and weekends. The northbound route goes to Daly City BART and the southbound route to Palo Alto Transit Center. The northbound weekday service is scheduled to operate from 4:06 a.m. to 2:08 a.m. and the southbound weekday service is scheduled to operate from 4:40 a.m. to 2:06 a.m. Northbound Saturday Service is scheduled to operate from 4:47 a.m. to 1:55 a.m. and the southbound Saturday service is scheduled to operate from 5:45 a.m. to 2:21 a.m. The northbound Sunday service is scheduled from 4:50 a.m. to 1:56 a.m. and the southbound Sunday service is scheduled to operate from 5:41 a.m. to 2:15 a.m. Within the Town of Atherton, bus stops are located at El Camino Real/Encinal Avenue, El Camino Real/Watkins Avenue, El Camino Real/Almendral Avenue, and El Camino Real/Amherst-Fifth Avenue. Route ECR also provides late night bus service that includes limited bus stations.

Route 84: Route 84 is active during school days only. The westbound route is active in the morning between 7:41 a.m. and 8:10 a.m. going to Hillview School. The westbound route leaving Hillview School is active between 2:40 p.m. and 3:11 p.m. on Wednesdays and Thursdays, and between 3:22 p.m. and 3:56 p.m. on Mondays, Tuesdays, and Fridays. Within the Town of Atherton, bus stops are located at Valparaiso Avenue/Elder Avenue, Valparaiso Avenue/Arbor Road, Valparaiso Avenue/University Drive, Middlefield Road/Oak Grove Avenue, Middlefield Road/Encinal Avenue, Middlefield Road/Lane Place, El Camino Real/Encinal Avenue, El Camino Real/Watkins Avenue, and Fair Oaks Lane/Mc Cormick Lane.

Route 296: Route 296 is active on weekdays and weekends. The northbound route goes to the Redwood City Transit Center and the southbound route to the Bayshore/Donohoe/Palo Alto Transit Center. The northbound weekday service is scheduled to operate from 3:46 a.m. to 12:23 a.m., and the northbound weekend service is scheduled from 3:45 a.m. to 12:26 a.m. The southbound weekday service is scheduled to operate from 6:05 a.m. to 2:44 a.m., and the southbound weekend service is scheduled from 6:43 a.m.



to 2:20 a.m. Within the Town of Atherton, bus stops are located at Middlefield Road/Oak Grove Avenue, Middlefield Road/James Avenue-Lane Place, Middlefield Road/Palmer Lane, and Middlefield Road/San Benito Avenue.

Route 397: Route 397 is active on weekdays and weekends. The northbound route goes to San Francisco and the southbound route to Palo Alto Transit Center. The weekday and weekend northbound service is scheduled to operate from 12:46 a.m. to 5:26 a.m., and the southbound service is scheduled to operate from 1:06 a.m. to 6:23 a.m. Within the Town of Atherton, bus stops are located at Middlefield Road/Oak Grove Avenue, Middlefield Road/James Avenue-Lane Place, Middlefield Road/Palmer Lane, and Middlefield Road/San Benito Avenue.

Route 88: Route 88 is active during school days only. The westbound route is active in the morning between 7:27 a.m. and 8:00 a.m. going to Encinal Elementary School from Bay/Marsh. The eastbound route leaving Encinal Elementary School is active between 2:02 p.m. and 2:33 p.m. on Thursdays, and between 3:12 p.m. and 3:43 p.m. on all weekdays except Thursdays. Within the Town of Atherton, bus stops are located at Middlefield Road/Oak Grove Avenue and Encinal Avenue/Felton Drive.

Route 286: Route 286 is active on weekdays only. The eastbound route goes to Menlo Park Caltrain and Middlefield Road/Oak Grove Avenue and the westbound route to Corte Madera High School and Sharon Green Apartments. The weekday eastbound service is scheduled to operate from 7:12 a.m. to 5:17 p.m. and the westbound service is scheduled to operate from 7:53 a.m. to 6:02 p.m. Within the Town of Atherton, bus stops are located at Middlefield Road/Oak Grove Avenue and Middlefield Road/Ringwood Avenue.

Route 82: Route 82 is active during school days only. The westbound route is active in the morning on all weekdays between 7:40 a.m. and 8:10 a.m. going to Hillview School. The westbound route leaving Hillview School is active between 2:45 p.m. and 3:12 p.m. on Wednesdays and Thursdays only. Within the Town of Atherton, bus stops are located at Valparaiso Avenue/Elder Avenue, Valparaiso Avenue/Arbor Road, Valparaiso Avenue/University Drive, Ringwood Avenue/Edge Road, Ringwood Avenue/Colby Avenue, Ringwood Avenue Frederick Avenue, and Bay Road/Del Norte Avenue.

Atherton Caltrain Station: Atherton Station is now a weekend-only Caltrain Station due to low ridership over a decade ago compared to stations in the adjacent cities of Redwood City and Menlo Park. The Redwood City Station is the fifth-busiest Caltrain station, serving 8,200 average weekday passengers, while the Menlo Park Station serves over 3,500 average weekday passengers. Fair Oaks Lane provides access to the Atherton Caltrain Station, but no sidewalks or bicycle lanes are provided which may limit its ridership potential. Weekday shuttle bus service to Redwood City was previously provided to the Atherton Station but discontinued in 2007 due to low ridership. The Town of Atherton has requested improved service to the station including a formal request in 2015. The station provides bicycle parking including 26 bicycle lockers. The northbound route to San Francisco operates from 7:37 a.m. to 11:09 p.m. and the southbound route to San Jose operates from 9:09 a.m. to 1:03 a.m.



DATA COLLECTION

Average Daily Traffic (ADT) Data

TJKM collected 24-hour bi-directional traffic volume tube counts on Tuesday, March 27, 2018 at the following 15 locations:

1. Alameda De Las Pulgas, south of Atherton Avenue
2. Atherton Avenue, between Monte Vista and Stern Lane
3. Valparaiso Avenue, between Park Lane and Santiago Avenue
4. Emilie Avenue, between Park Lane and Valparaiso Avenue
5. Alejandra Avenue, between Emilie Avenue and El Camino Real
6. El Camino Real, south of Odell Place
7. Fair Oaks Lane, between Mc Cormick Lane and Virginia Lane
8. Marsh Road, between Middlefield Road and Fair Oaks Avenue
9. Watkins Avenue, between Mc Cormick Lane and Burns Avenue
10. Middlefield Road, north of Encinal Avenue
11. Encinal Avenue, west of Middlefield Road
12. Glenwood Avenue, west of Middlefield Road
13. Oak Grove Avenue, west of Middlefield Road
14. Ravenswood Avenue, west of Middlefield Road
15. Ringwood Avenue, between Colby Avenue and Parkwood Drive

Table 4 summarizes the 24-hour traffic volumes (vehicles per day (vpd)) collected and **Appendix A** contains the raw data. **Figure 2** illustrates the ADT collected at each of the 15 locations.



Table 4: Average Daily Traffic Summary for Historical (2015) & Existing (2018)

<i>Location</i>	<i>2015 EB Volumes (vpd)</i>	<i>Existing 2018 EB Volumes (vpd)</i>	<i>2015 WB Volumes (vpd)</i>	<i>Existing 2018 WB Volumes (vpd)</i>	<i>2015 Total (vpd)</i>	<i>Existing 2018 Total (vpd)</i>
Atherton Avenue, between Monte Vista & Stern Lane ²	3,857	3,070	4,962	4,264	8,819	7,334
Valparaiso Avenue, between Park Lane & Santiago Avenue ³	6,500	5,962	6,399	6,006	12,899	11,968
Alejandra Avenue, between Emilie Avenue & El Camino Real	1,218	1,091	1,263	1,096	2,481	2,187
Fair Oaks Lane, between Mc Cormick Lane & Virginia Lane ⁴	2,292	2,394	2,827	2,911	5,119	5,305
Marsh Road, between Middlefield Road & Fair Oaks Avenue	N/A	11,126	N/A	11,040	22,185	22,166
Watkins Avenue, between Mc Cormick Lane & Burns Avenue ⁵	1,875	1,927	1,525	1,869	3,400	3,796
Encinal Avenue, west of Middlefield Road	N/A	2,523	N/A	2,933	4,854	5,456
Glenwood Avenue, west of Middlefield Road	1,699	1,772	2,587	2,765	4,286	4,537
Oak Grove Avenue, west of Middlefield Road	N/A	4,147	N/A	4,424	N/A	8,571
Ravenswood Avenue, west of Middlefield Road	N/A	8,372	N/A	6,869	N/A	15,241
Ringwood Avenue, between Colby Avenue & Parkwood Drive	N/A	3,896	N/A	3,522	N/A	7,418
<i>Location</i>	<i>2015 NB Volumes (vpd)</i>	<i>Existing 2018 NB Volumes (vpd)</i>	<i>2015 SB Volumes (vpd)</i>	<i>Existing 2018 SB Volumes (vpd)</i>	<i>2015 Total (vpd)</i>	<i>Existing 2018 Total (vpd)</i>
Alameda De Las Pulgas, south of Atherton Avenue ⁶	N/A	7,277	N/A	7,152	14,185	14,429
Emilie Avenue, between Park Lane & Valparaiso Avenue	N/A	831	N/A	1,621	N/A	2,452
El Camino Real, south of Odell Place ⁷	N/A	17,578	N/A	15,166	36,774	32,744
Middlefield Road, north of Encinal Avenue	N/A	9,923	N/A	9,618	18,335	19,541

Notes

¹Historical counts were provided by the Town of Atherton. Historical ADT count locations differing from existing locations are listed below.

²ADT collected between Selby Lane and Barry Lane.

³ADT collected west of Elena Avenue.

⁴ADT collected east of El Camino Real.

⁵ADT collected north of the train tracks.

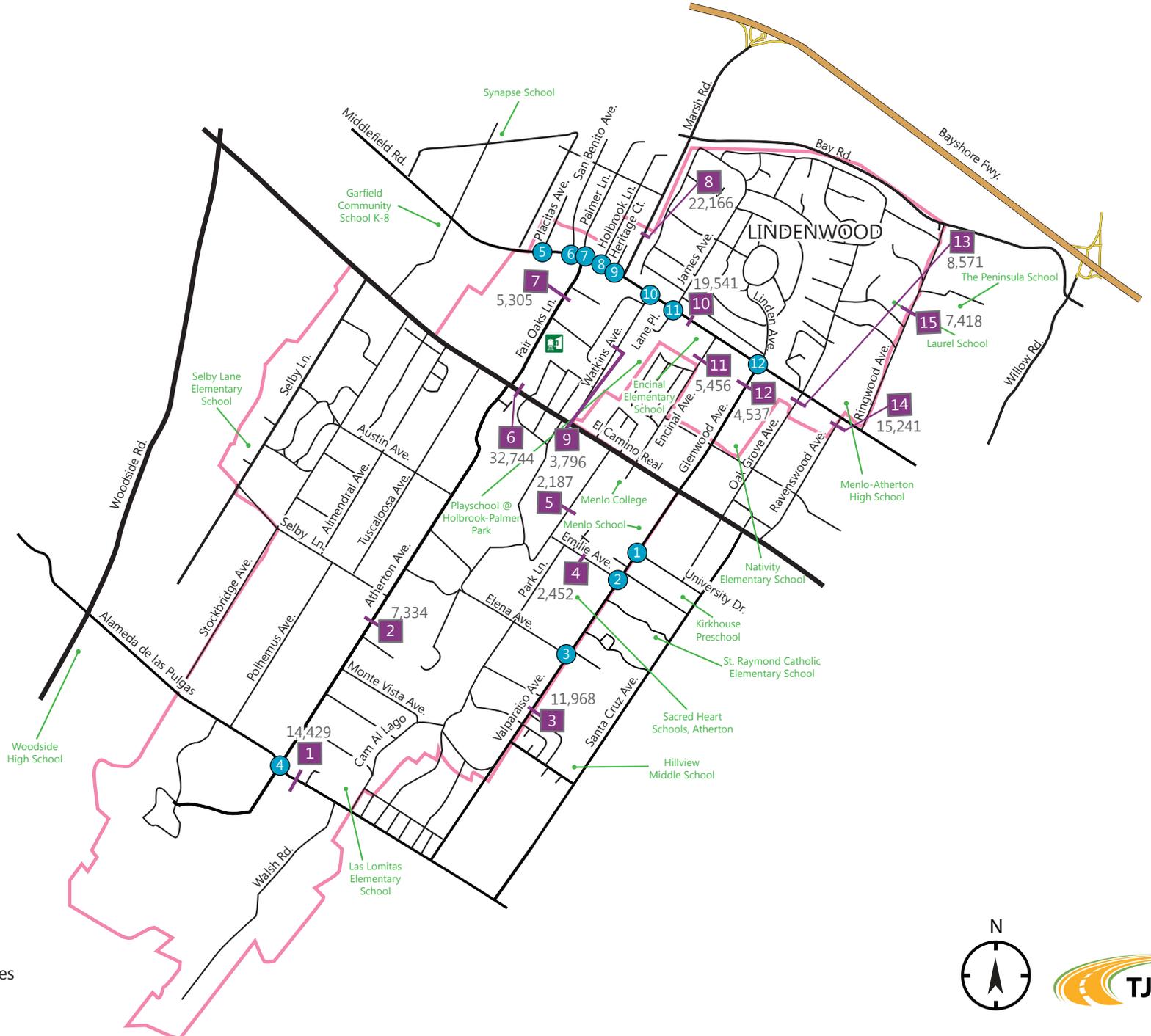
⁶ADT collected north of Camino Al Lago.

⁷ADT collected south of Almendral Avenue.

Average Daily Traffic Volumes Map

LEGEND

-  Study Intersection
-  Town Limit
-  Schools
-  Study Segments
- XX Weekday ADT Volumes
-  Caltrain





Intersection Turning Movement Counts (TMC)

On Tuesday, March 27, 2018, TJKM collected intersection TMC for vehicles, pedestrians, and bicycles at the 12 study intersections for the weekday a.m. (7:00 a.m. – 9:00 a.m.), school p.m. (2:00 p.m. – 4:00 p.m.), and p.m. (4:00 p.m. – 6:00 p.m.) peak periods. TMC data was collected on a typical weekday when all schools within the study area were in session. **Table 5** lists the schools that were in session during the time that TMC were collected. **Figure 3** illustrates the existing lane geometry and traffic control and **Figure 4** illustrates existing traffic volumes for all study intersections respectively. **Figure 5** illustrates existing pedestrian and bicycle volumes at all study intersections. **Appendix A** contains the TMC data collected for all of the study intersections.

Table 5: List of Schools within the Project Study Area

School	Vacation Schedule	
	Easter Break	Spring Break
Selby Lane Elementary School	03/30	04/09-04/13
Las Lomas Elementary School District	-	04/09-04/13
Sacred Heart Schools	03/29-04/08	
Menlo School	03/30	04/09-04/13
Playschool at Holbrook-Palmer Park	03/30	04/09-04/13
Encinal Elementary School	03/30	04/09-04/13
Garfield Elementary School	03/30	04/09-04/13
Nativity Catholic School	03/30-04/08	
Synapse School	-	04/09-04/13
Peninsula School	-	04/09-04/13
Laurel School	03/30	04/09-04/13
Menlo-Atherton High School	03/30	04/09-04/13
Woodside High School	03/30	04/09-04/13

Existing Signal Timing

TJKM obtained the existing traffic signal timing sheets and phase diagrams, at the intersection of Valparaiso Avenue and University Drive, from the City of Menlo Park for the purpose of the existing conditions analysis.

Origin-Destination (OD) Data

TJKM used the StreetLight Insight® Data platform, which utilizes Big Data for evaluating trip patterns within the study area. TJKM processed data for April 2017 and October 2017 for the OD analysis. The Willow Road/US 101 Interchange Improvement project entered its construction phase in May 2017, and is expected to continue for approximately two years. Hence, the OD study was conducted “Before Construction” in April 2017 and “Ongoing Construction” in October 2017 to ascertain the impacts to the Town’s roadway system. StreetLight Insight® provides trip attributes for all months of the year, including historical data up to 2014, depending on the analysis conducted. However, the parameters adopted for

Existing Lane Geometry and Traffic Controls

<p>Intersection #1 Valparaiso Ave. / University Dr.</p>	<p>Intersection #2 Valparaiso Ave. / Emilie Ave.</p>	<p>Intersection #3 Valparaiso Ave. / Elena Ave.</p>	<p>Intersection #4 Alameda De Las Pulgas / Atherton Ave.</p>
<p>Intersection #5 Middlefield Rd. / Placitas Ave.</p>	<p>Intersection #6 Middlefield Rd. / San Benito Ave.</p>	<p>Intersection #7 Middlefield Rd. / Fair Oaks Ln. & Palmer Ln.</p>	<p>Intersection #8 Middlefield Rd. / Holbrook Ln.</p>
<p>Intersection #9 Middlefield Rd. / Heritage Ct.</p>	<p>Intersection #10 Middlefield Rd. / Watkins Ave.</p>	<p>Intersection #11 Middlefield Rd. / James Ave. & Lane Pl.</p>	<p>Intersection #12 Middlefield Rd. / Glenwood Ave. & Linden Ave.</p>

LEGEND

-  Study Intersection
-  Town Limit
-  Schools
-  Stop Sign
-  Traffic Signal
-  Caltrain



Existing Peak Hour Traffic Volumes

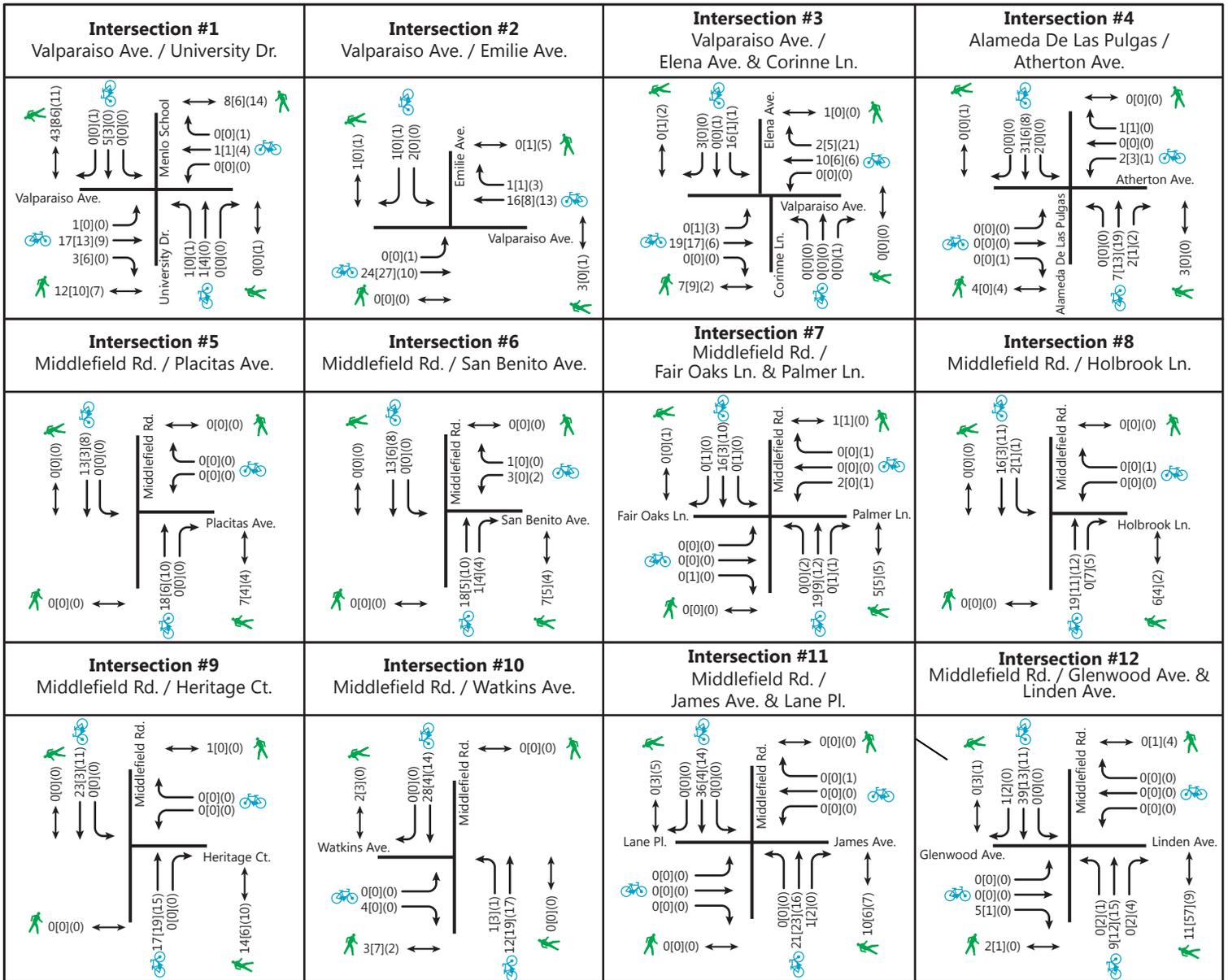
Intersection #1 Valparaiso Ave. / University Dr.	Intersection #2 Valparaiso Ave. / Emilie Ave.	Intersection #3 Valparaiso Ave. / Elena Ave.	Intersection #4 Alameda De Las Pulgas / Atherton Ave.
Intersection #5 Middlefield Rd. / Placitas Ave.	Intersection #6 Middlefield Rd. / San Benito Ave.	Intersection #7 Middlefield Rd. / Fair Oaks Ln. & Palmer Ln.	Intersection #8 Middlefield Rd. / Holbrook Ln.
Intersection #9 Middlefield Rd. / Heritage Ct.	Intersection #10 Middlefield Rd. / Watkins Ave.	Intersection #11 Middlefield Rd. / James Ave. & Lane Pl.	Intersection #12 Middlefield Rd. / Glenwood Ave. & Linden Ave.

LEGEND

-  Study Intersection
-  Town Limit
-  Schools
- XX AM Peak Hour Volume
- [XX] PM Peak School Hour Volume
- (XX) PM Peak Hour Volume
-  Caltrain



Existing Pedestrian and Bike Volumes



LEGEND

Study Intersection

Town Limit

Schools

XX AM Peak Hour Volume

[XX] PM Peak School Hour Volume

(XX) PM Peak Hour Volume

Caltrain





this study only provided data until October 2017. In order to obtain a dataset unbiased by irregular traffic patterns as a result of holidays and weather conditions, data from April 2017 and October 2017 on a typical Tuesday, Wednesday, and Thursday was used for the analysis.

Appendix B contains the OD processed data obtained from StreetLight Insight® Data platform for the project.

EXISTING CONDITIONS (2018) LOS & 95TH PERCENTILE QUEUE LENGTH ANALYSIS

The Existing Conditions (2018) scenario evaluates all study intersections with existing lane geometry, traffic controls, and traffic volumes. The results of the LOS and motor vehicle delay analysis and 95th percentile motor vehicle queue length in feet (ft.) analysis, using Synchro and SimTraffic software, are summarized in **Tables 6** and **7** respectively. SimTraffic was used to analyze 95th percentile queue lengths at all intersections. **Appendix C** contains the HCM 6th Edition Synchro LOS and queues reports for all study intersections.

Atherton's proposed minimum acceptable intersection LOS standards for minor arterial and collector streets, in the proposed General Plan update, is LOS D, while the proposed standard for collector and local streets is LOS C and for Highway is LOS E. Under the Existing Conditions (2018) scenario, the intersections of Valparaiso Avenue/University Drive and Middlefield Road/Placitas Avenue operate at LOS C during the weekday, a.m., school p.m., and p.m. peak periods, thus meeting the proposed LOS standard for minor arterials. The following collector street intersections operate with unacceptable LOS of E or F:

- Valparaiso Avenue/Emilie Avenue (all peak hours)
- Valparaiso Avenue/Elena Avenue (all peak hours)
- Alameda De Las Pulgas/Atherton Avenue (all peak hours)
- Middlefield Road/Fair Oaks Lane-Palmer Lane (all peak hours)
- Middlefield Road/Holbrook Lane (a.m. peak hour)
- Middlefield Road/Watkins Avenue (all peak hours)
- Middlefield Road/James Avenue-Lane Place (all peak hours)
- Middlefield Road/Glenwood Avenue-Linden Avenue (all peak hours)



Table 6: Existing Conditions LOS & Delay

#	Study Intersections	Control	Peak Hour	Existing Conditions	
				Average Delay ¹ (sec)	LOS
1	Valparaiso Avenue/University Drive	Signalized	A.M.	23.2	C
			School P.M.	22.4	C
			P.M.	22.9	C
2	Valparaiso Avenue/Emilie Avenue	One-Way Stop	A.M.	>50.0	F
			School P.M.	>50.0	F
			P.M.	>50.0	F
3	Valparaiso Avenue/Elena Avenue-Corrine Lane	Two-Way Stop	A.M.	>50.0	F
			School P.M.	>50.0	F
			P.M.	>50.0	F
4	Alameda De Las Pulgas/Atherton Avenue	All-Way Stop	A.M.	>50.0	F
			School P.M.	>50.0	F
			P.M.	>50.0	F
5	Middlefield Road/Placitas Avenue	One-Way Stop	A.M.	17.3	C
			School P.M.	20.5	C
			P.M.	21.5	C
6	Middlefield Road/San Benito Avenue	One-Way Stop	A.M.	21.8	C
			School P.M.	22.2	C
			P.M.	27.7	D
7	Middlefield Road/Fair Oaks Lane-Palmer Lane	Two-Way Stop	A.M.	>50.0	F
			School P.M.	47.8	E
			P.M.	>50.0	F
8	Middlefield Road/Holbrook Lane	One-Way Stop	A.M.	>50.0	F
			School P.M.	22.5	C
			P.M.	22.6	C
9	Middlefield Road/Heritage Court	One-Way Stop	A.M.	29.6	D
			School P.M.	23.0	C
			P.M.	32.7	D
10	Middlefield Road/Watkins Avenue	One-Way Stop	A.M.	>50.0	F
			School P.M.	>50.0	F
			P.M.	>50.0	F
11	Middlefield Road/James Avenue-Lane Place	Two-Way Stop	A.M.	>50.0	F
			School P.M.	38.9	E
			P.M.	>50.0	F
12	Middlefield Road/Glenwood Avenue-Linden Avenue	Two-Way Stop	A.M.	>50.0	F
			School P.M.	>50.0	F
			P.M.	>50.0	F

Notes:

¹Delay: Overall intersection delay in seconds per vehicle for signalized and unsignalized all-way stop controlled intersections. Delay for minor approach worst movement or major approach critical movements at unsignalized one-way and two-way stop controlled intersections.

Delay is reported as >50.0 for unsignalized intersections with LOS F and >80.0 for signalized intersections consistent with HCM 2000 methodology.

Bold indicates unacceptable LOS.



Table 7 summarizes the 95th percentile queue lengths for all approach movements at the study intersections for the weekday a.m., school p.m., and p.m. peak hour. Existing conditions queue length analysis resulted in several intersections with 95th percentile queue lengths exceeding storage capacity.

Based on SimTraffic analysis results, intersections where queue lengths exceed the existing storage lengths are listed below:

- Valparaiso Avenue/University Drive for EBL (a.m. peak hour), WBL and SBL (all peak hours)
- Alameda de Las Pulgas/Atherton Avenue for SBL (a.m. peak hour)
- Middlefield Road/Fair Oaks Lane-Palmer Lane for EBR (all peak hours)
- Middlefield Road/Watkins Avenue for EBR (all peak hours) and NBL (p.m. peak hour)
- Middlefield Road/Lane Place-James Avenue for WBR (all peak hours)
- Middlefield Road/Glenwood Avenue-Linden Avenue for EBR (a.m. and school p.m. peak hours) and NBL (a.m. peak hour)

Short-range and long-range strategies will be developed using the Synchro files developed and the results obtained from the existing conditions analysis in order to alleviate the existing traffic conditions at the selected study intersections.



Table 7: Existing Conditions 95th Percentile Queue Lengths (ft.)

#	Study Intersection	Lane Group	Storage Length per lane (ft.)	Existing Conditions		
				A.M.	School P.M.	P.M.
1	Valparaiso Avenue/University Drive	EBL	110	157	96	77
		EBT	-	260	268	265
		WBL	80	112	93	90
		WBTR	-	414	292	250
		NBLTR	-	153	178	210
		SBL	40	74	72	66
		SBTR	-	130	132	103
2	Valparaiso Avenue/Emilie Avenue	EBTL	-	185	202	205
		WBTLR	-	<25	<25	<25
		SBLR	-	218	148	161
3	Valparaiso Avenue/Elena Avenue-Corinne Lane	EBLTR	-	102	197	251
		WBLTR	-	32	<25	29
		NBLR	-	30	<25	30
		SBLR	-	192	299	342
4	Alameda De Las Pulgas/Atherton Avenue	EBLTR	-	69	52	49
		WBTL	-	273	1570	1307
		WBR	-	138	102	102
		NBL	65	62	53	62
		NBTR	-	206	267	220
		SBL	110	225	62	66
		SBTR	-	706	114	114
5	Middlefield Road/Placitas Avenue	WBLR	-	<25	<25	<25
		NBTR	-	-	-	-
		SBTL	-	<25	<25	<25
6	Middlefield Road/San Benito Avenue	WBLR	-	64	45	52
		NBTR	-	-	-	-
		SBTL	-	<25	32	64
7	Middlefield Road/Fair Oaks Lane-Palmer Lane	EBTL	-	59	97	105
		EBR	20	82	93	86
		WBLTR	-	100	43	42
		NBL	75	70	53	71
		NBTR	-	<25	<25	<25
		SBLTR	-	35	48	57
8	Middlefield Road/Holbrook Lane	WBLR	-	71	45	43
		NBTR	-	-	-	-
		SBTL	-	60	69	78



#	Study Intersection	Lane Group	Storage Length per lane (ft.)	Existing Conditions		
				A.M.	School P.M.	P.M.
9	Middlefield Road/Heritage Court	WBLR	-	<25	<25	25
		NBTR	-	<25	-	-
		SBTL	-	<25	-	<25
10	Middlefield Road/Watkins Avenue	EBL	-	299	559	173
		EBR	20	101	106	84
		NBL	70	66	61	71
		NBTR	-	33	42	38
		SBTR	-	40	39	27
11	Middlefield Road/Lane Place-James Avenue	EBLTR	-	<25	<25	25
		WBTL		30	35	43
		WBR	35	58	71	59
		NBL	75	<25	<25	<25
		NBTR	-	<25	<25	<25
		SBL	75	54	44	42
		SBTR	-	<25	<25	<25
12	Middlefield Road/Glenwood Avenue-Linden Avenue	EBTL	-	87	91	66
		EBR	60	71	63	52
		WBLTR	-	64	88	56
		NBL	55	57	50	43
		NBTR	-	<25	<25	<25
		SBL	80	25	26	28
		SBTR	-	<25	30	27

Notes:

EB, WB, NB, SB – Eastbound, Westbound, Northbound, Southbound respectively.

L, T, R – Left, Through, Right respectively.

Queue lengths taken from SimTraffic reports.

Bold indicates queue lengths exceeding existing storage capacity.



ORIGIN-DESTINATION (OD) ANALYSIS

StreetLight Insight® Data platform, which utilizes Big Data for evaluating trip patterns within a study area was used for OD analysis for this project. The objective of this task was to ascertain the percentage of traffic that is currently using arterials such as Alameda De Las Pulgas, El Camino Real and Middlefield Road as cut-through routes to bypass parallel interstates such as US 101 and I 280. The general perception is that majority of the traffic that uses these arterials within the Town originates outside of the Town limits. This results in higher delays for the Atherton community to access these routes. Additionally, with the ongoing construction at the Willow Pass Road/US 101 interchange, it is perceived that there is a certain amount of cut-through traffic that uses internal Town streets to bypass the congestion on US 101.

The Willow Road/US 101 Interchange Improvement project entered its construction phase in May 2017, which is expected to continue for approximately two years. Hence, the OD study was conducted “Before Construction” in April 2017 which would depict typical traffic conditions within the Town. StreetLight Insight® provides trip attributes for all months of the year including historical data up to 2014 depending on the analysis conducted. In order to obtain a dataset unbiased by irregular traffic patterns as a result of holidays and weather conditions, data from April 2017 on a typical Tuesday, Wednesday and Thursday was used for the analysis.

The origins and destinations used for the study are listed below:

1. Alameda De Las Pulgas, north of Stockbridge Avenue (Zone 1)
2. Alameda De Las Pulgas, south of Valparaiso Avenue (Zone 7)
3. El Camino Real, north of Selby Lane (Zone 8)
4. El Camino Real, south of Valparaiso Avenue (Zone 9)
5. Middlefield Road, north of Placitas Avenue (Zone 11)
6. Middlefield Road, south of Ringwood Avenue (Zone 12)
7. US 101, north of Marsh Road Interchange (Zone 14)
8. US 101, south of Willow Pass Road Interchange (Zone 15)

The study evaluated the percentage of trips using parallel routes to US 101 and I 280 interstates such as Alameda De Las Pulgas, El Camino Real and Middlefield Road to get to and from each of the origins and destinations using internal streets. **Figure 6** illustrates the origins, destinations, and middle filters selected for the study. A middle filter is a parameter, within the StreetLight Insight® Data platform, which is used to ensure that the trips captured at the origin and destination have traveled on the specific route being evaluated.

The middle filters used for the study include:

1. Stockbridge Avenue, west of El Camino Real (Zone 2)
2. Selby Lane, west of El Camino Real (Zone 3)
3. Alameda de Las Pulgas, north of Valparaiso Avenue (Zone 4)
4. Atherton Avenue, west of El Camino Real (Zone 5)
5. Valparaiso Avenue, west of El Camino Real (Zone 6)



6. Fair Oaks Lane, west of Middlefield Road (Zone 10)
7. Marsh Road, east of Middlefield Road (Zone 13)
8. Bay Road, north of Ringwood Avenue (Zone 16)
9. El Camino Real, south of Atherton Avenue (Zone 18)

Based on the number of origins and destinations and parallel routes available, 640 route choices were evaluated as a part of the study to determine traffic behavior within the study area. **Figures 7 to 14** summarize the findings of the OD study.

It should be noted that, given the number of route choices and overlapping middle filters for trips originating from a specific origin zone to destination zones, the analysis includes a certain amount of double counting of trips. For example, a trip originating at Zone 8 going to Zone 7 via Zone 5 would also be counted in the analysis of trips originating from Zone 8 to Zone 7 via Zone 4. This analysis represents preferred route choices of captured trips at the origin zones within the Town.

Table 8 summarizes the number of vehicle trips that originate outside of Atherton.

Table 8: Vehicle Trips Originating Outside of Atherton

<i>Middle Filter Zones</i>	<i>Number of Trips Through Middle Filters Per Peak Period</i>		
	<i>A.M.</i>	<i>School P.M.</i>	<i>P.M.</i>
Zone 10 EB (Fair Oaks Lane)	135	179	198
Zone 10 WB (Fair Oaks Lane)	355	97	133
Zone 13 EB (Marsh Road)	882	691	632
Zone 13 WB (Marsh Road)	941	619	551
Zone 17 NB (Middlefield Road)	451	562	535
Zone 17 SB (Middlefield Road)	685	506	507
Zone 2 EB (Stockbridge Avenue)	146	64	42
Zone 2 WB (Stockbridge Avenue)	269	83	133
Zone 3 EB (Selby Lane)	365	206	191
Zone 3 WB (Selby Lane)	567	270	287
Zone 4 NB (Alameda de Las Pulgas)	415	368	431
Zone 4 SB (Alameda de Las Pulgas)	787	352	354
Zone 5 EB (Atherton Avenue)	257	213	299
Zone 5 WB (Atherton Avenue)	596	137	318
Zone 6 EB (Valparaiso Avenue)	489	455	275
Zone 6 WB (Valparaiso Avenue)	865	410	501
Zone 8 NB (El Camino Real)	2713	1481	2225
Zone 8 SB (El Camino Real)	3375	1156	1639
Total At Middle Filters	14,293	7,849	9,251
Total Trips at Origins	5905	2867	3758
Difference of Trips Remaining in Atherton	8388	4982	5493
Total Trips Originating Outside of Atherton	41%	37%	41%



Figure 7: Preferred Route Choices from Origin Zone 1

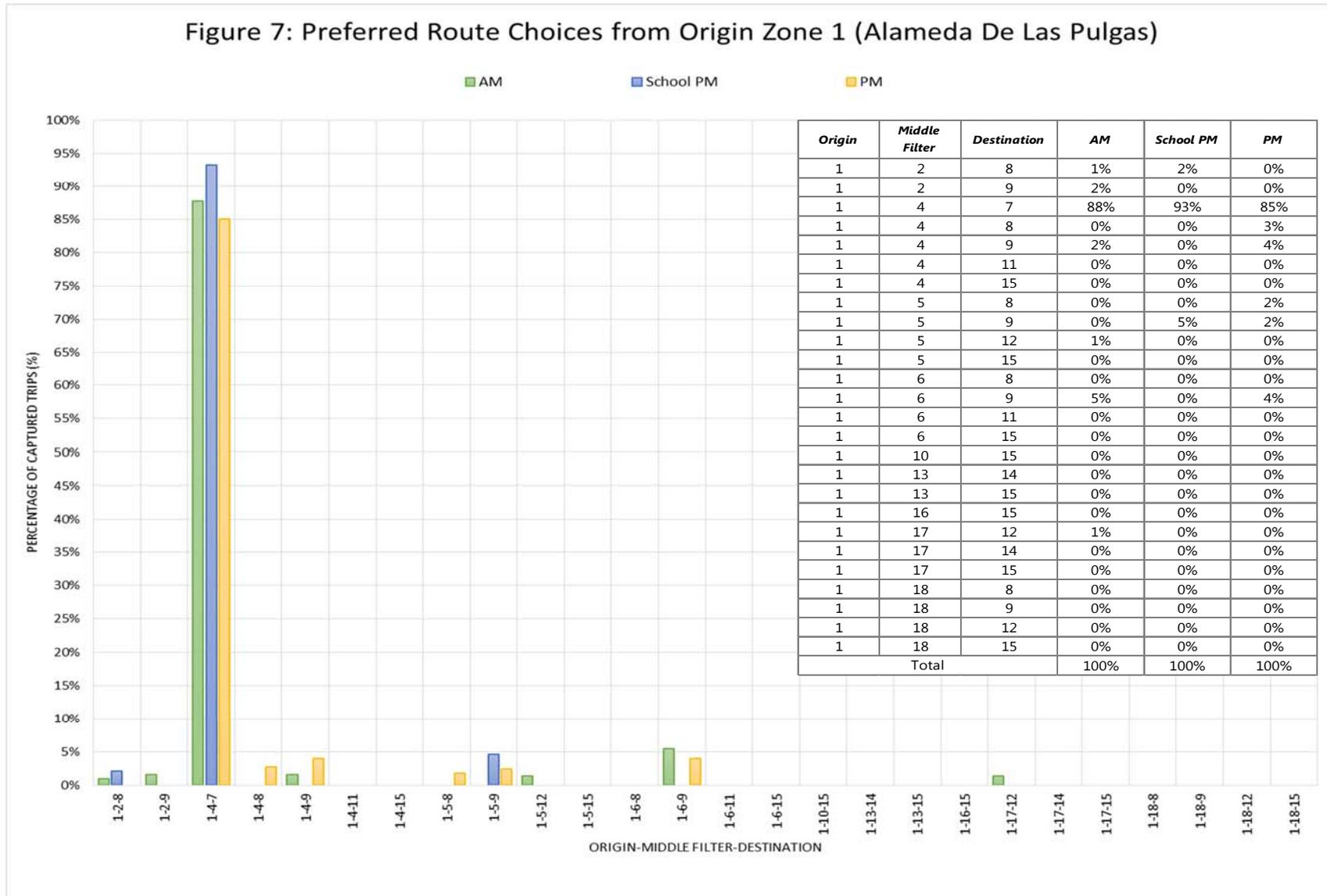




Figure 8: Preferred Route Choices from Origin Zone 7

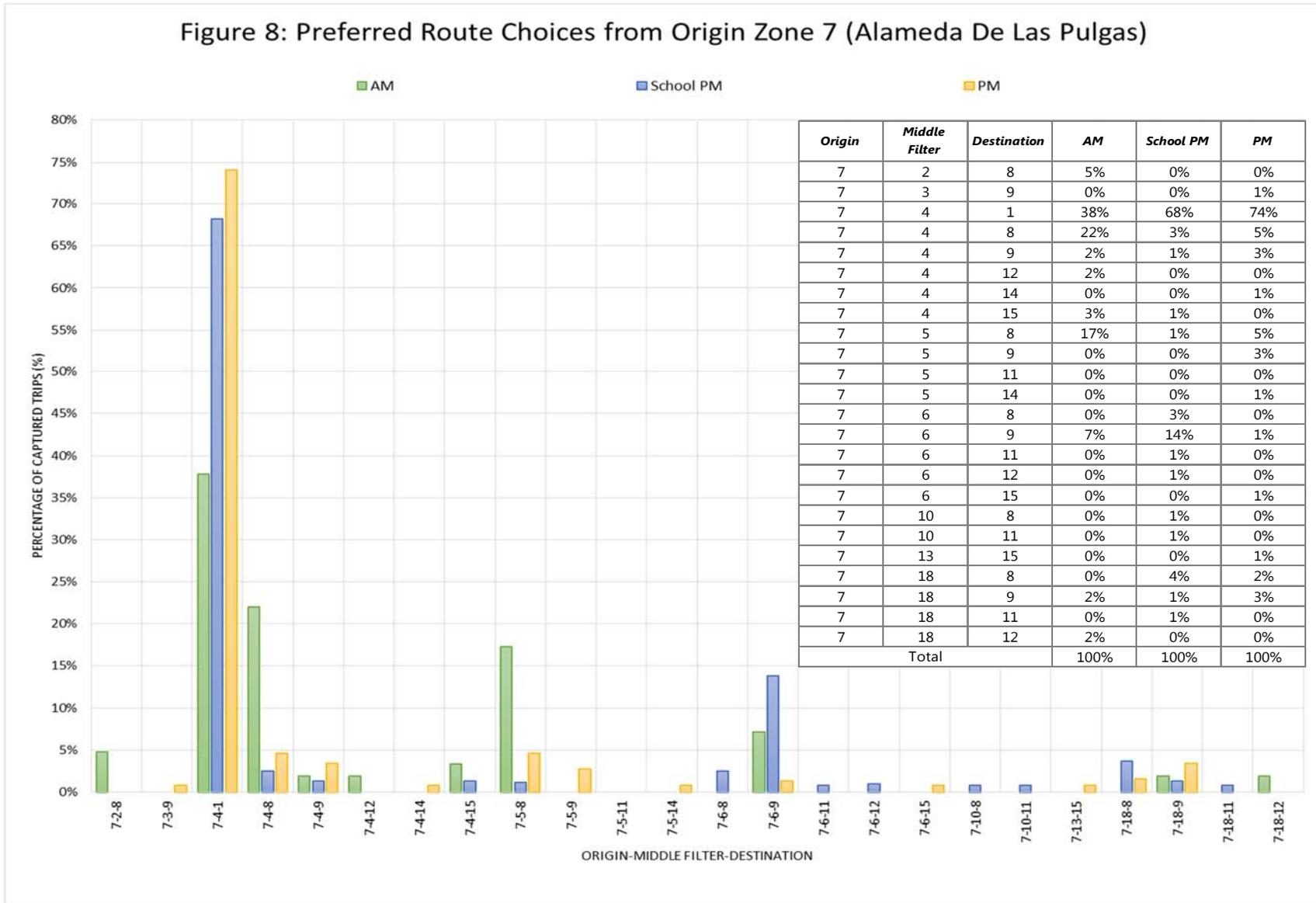




Figure 9: Preferred Route Choices from Origin Zone 8

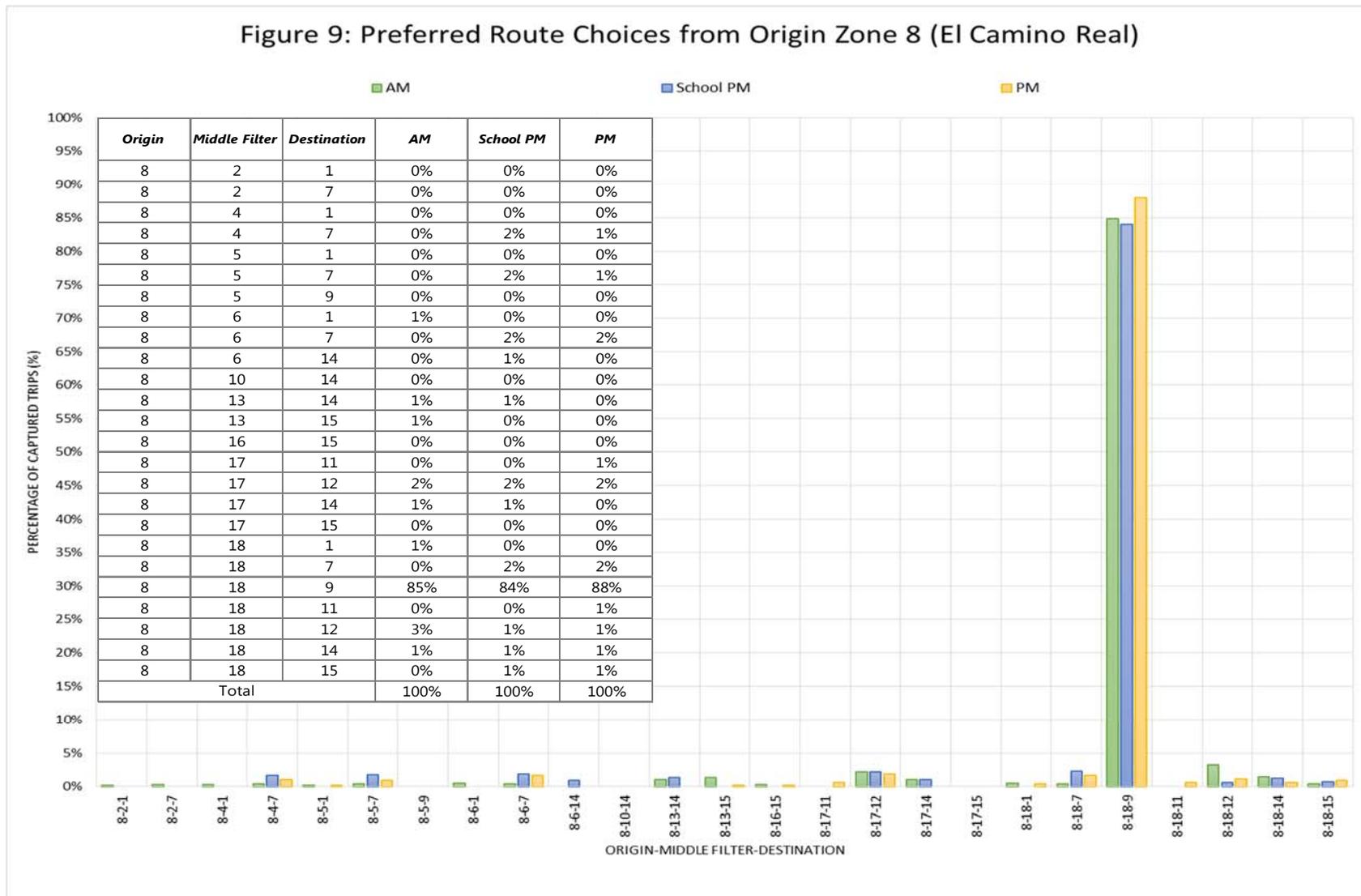




Figure 10: Preferred Route Choices from Origin Zone 9

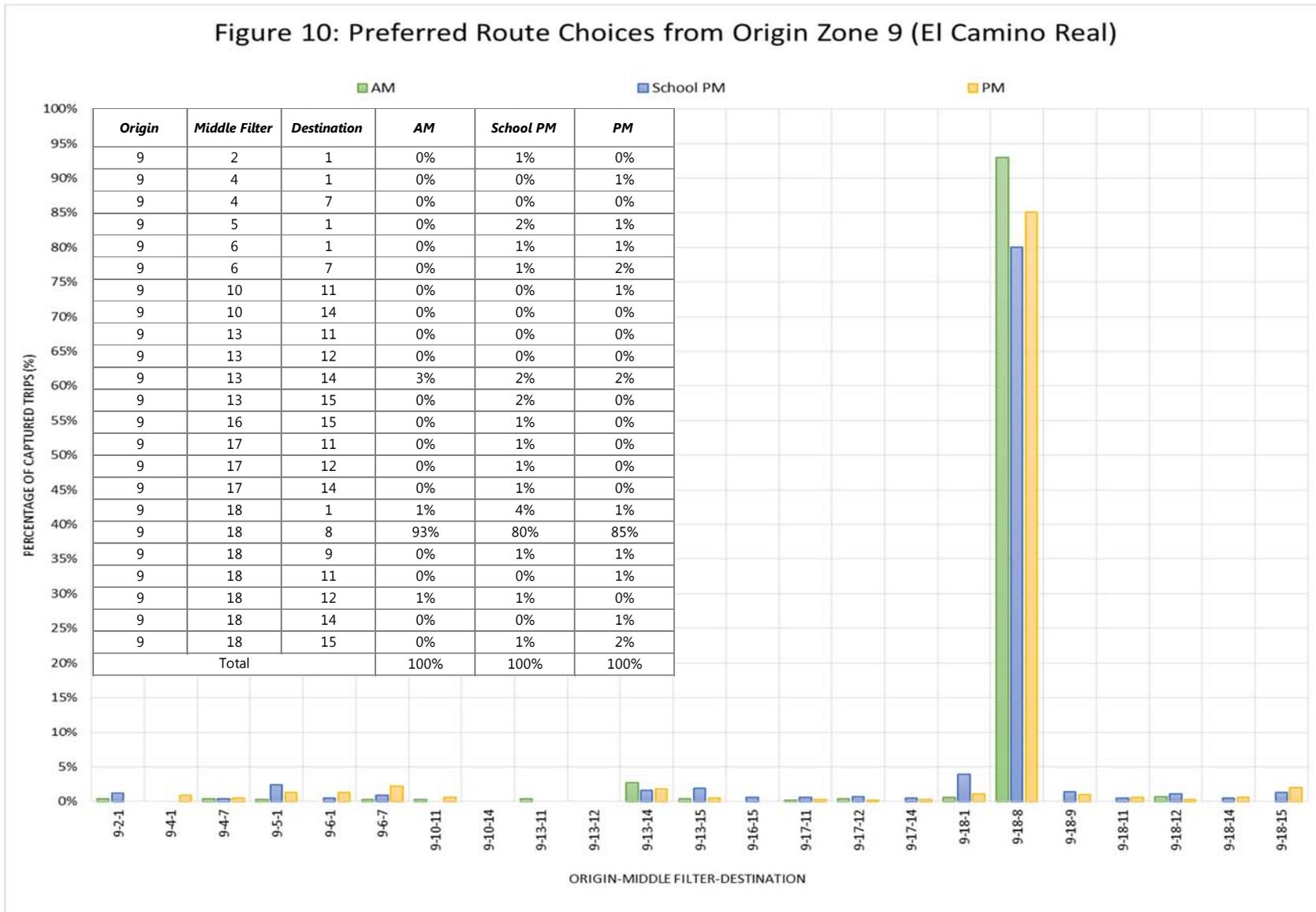




Figure 11: Preferred Route Choices from Origin Zone 11

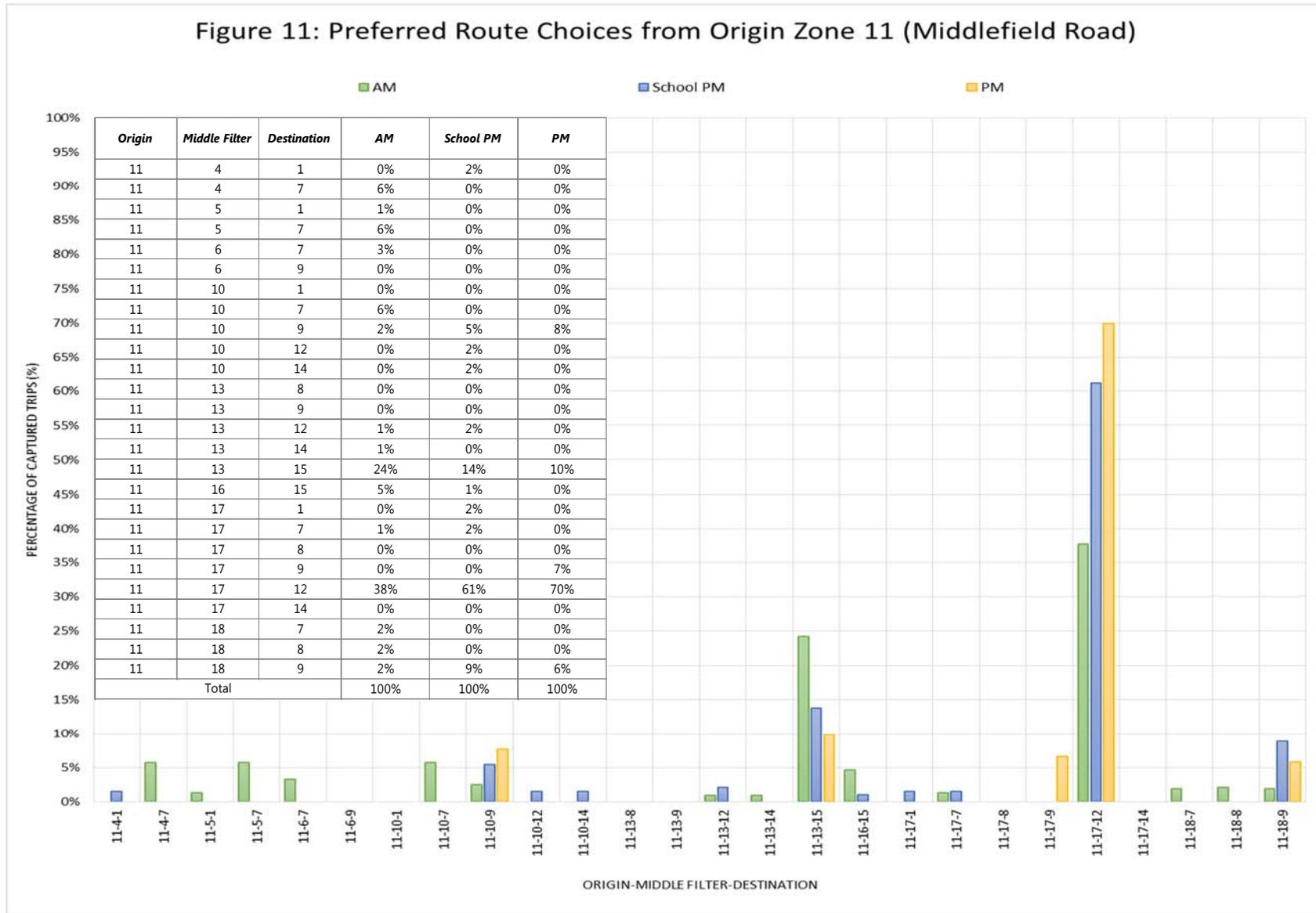




Figure 12: Preferred Route Choices from Origin Zone 12

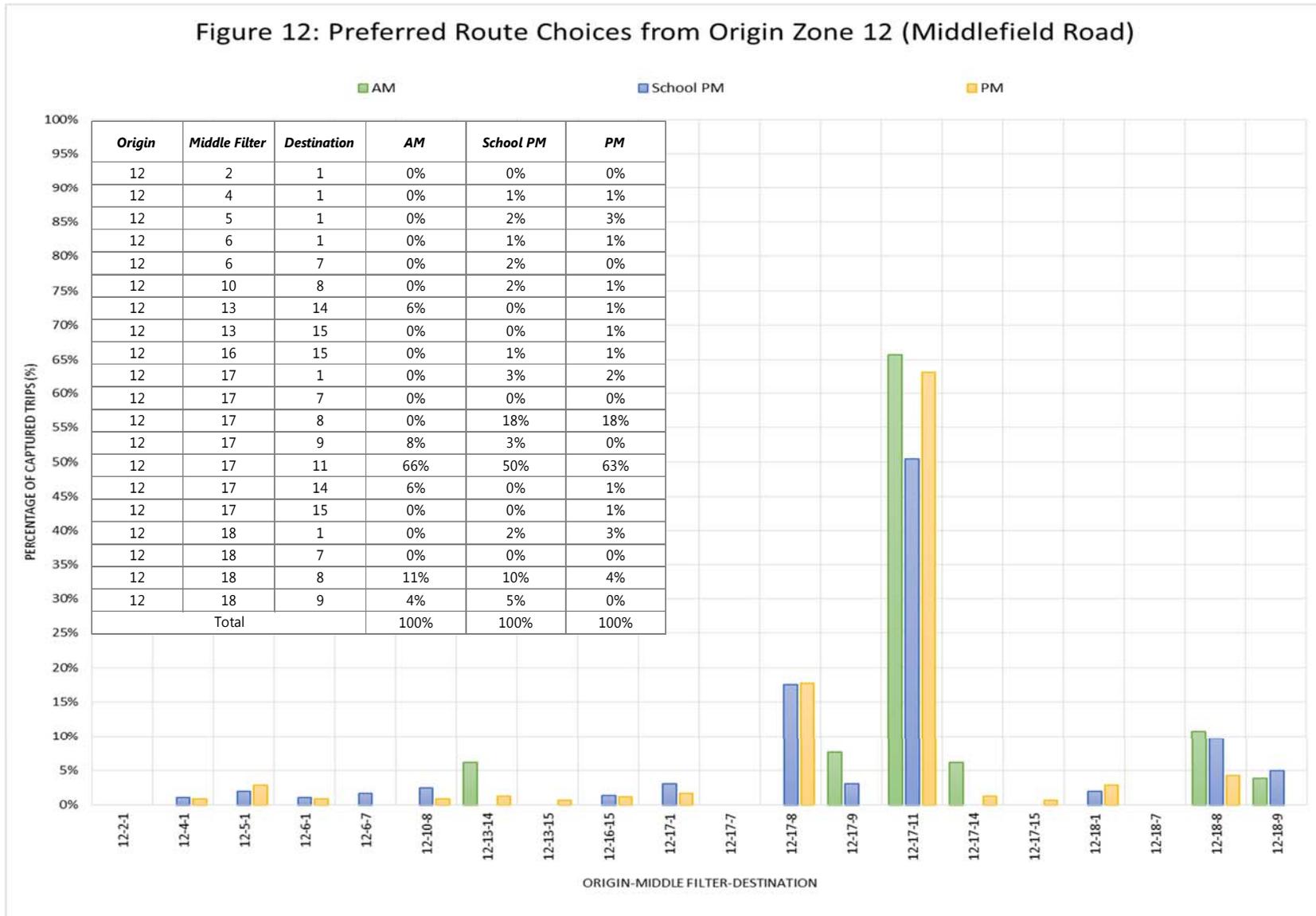




Figure 13: Preferred Route Choices from Origin Zone 14

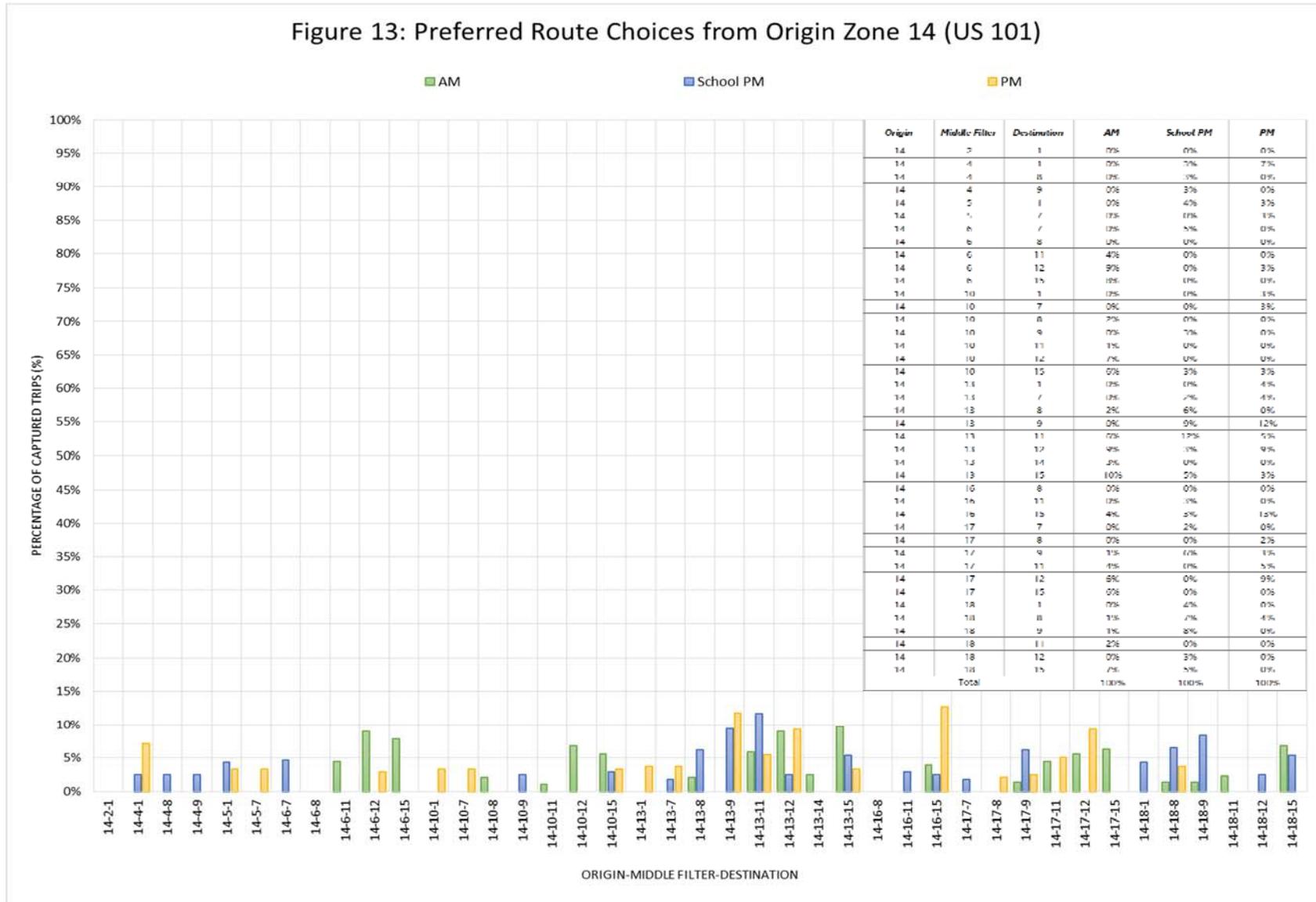
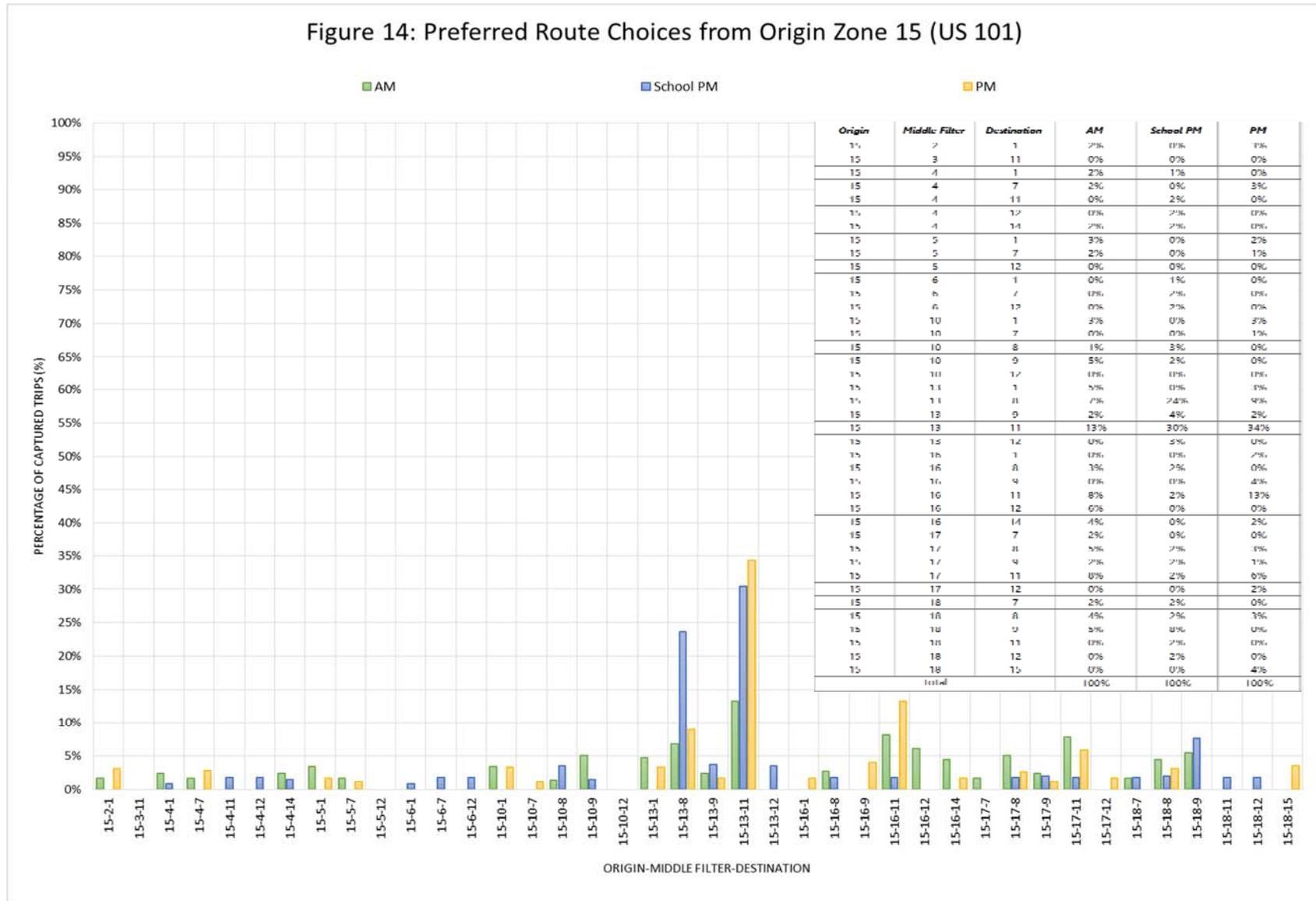




Figure 14: Preferred Route Choices from Origin Zone 15





The OD survey analysis resulted in the following findings:

Routes originating from Origin Zone 1 (Figure 7):

- a) Majority of trips captured at Origin Zone 1 pass through the Town via destination Zone 7. This constitutes for approximately 89% of the captured trips at Zone 1 averaged over all peak periods.
- b) The remaining 11% of captured trips primarily use Atherton Avenue and Valparaiso Avenue to El Camino Real (Zone 9), including a small percentage of trips using Stockbridge Avenue and Selby Lane. This also includes a small percentage of trips going to the remaining destination zones as shown in **Figure 7**.

Routes originating from Origin Zone 7 (Figure 8):

- a) Majority of trips captured at Origin Zone 7 pass through the Town via destination Zone 1. This constitutes for approximately 60% of the captured trips at Zone 7 averaged over all peak periods.
- b) The remaining captured trips primarily use Atherton Avenue and Valparaiso Avenue to El Camino Real (Zones 8 and 9).), including a small percentage of trips using Stockbridge Avenue and Selby Lane. This also includes a small percentage of trips going to the remaining destination zones as shown in **Figure 8**.

Routes originating from Origin Zone 8 (Figure 9):

- a) Majority of trips captured at Origin Zone 8 pass through the Town via destination Zone 9. This constitutes for approximately 86% of the captured trips at Zone 8 averaged over all peak periods.
- b) The remaining captured trips use local streets to Alameda De Las Pulgas, Middlefield Road, and US 101 as shown in **Figure 9**.

Routes originating from Origin Zone 9 (Figure 10):

- a) Majority of trips captured at Origin Zone 9 pass through the Town via destination Zone 8. This constitutes for approximately 86% of the captured trips at Zone 9 averaged over all peak periods.
- b) The remaining captured trips use local streets to Alameda De Las Pulgas, Middlefield Road, and US 101 as shown in **Figure 10**.

Routes originating from Origin Zone 11 (Figure 11):

- a) Majority of trips captured at Origin Zone 11 pass through the Town via destination Zone 12. This constitutes approximately 56% of the captured trips at Zone 11 averaged over all peak periods. The percentage of pass through trips during the school p.m. and p.m. peak periods are substantially higher than the a.m. peak period.
- b) Approximately 16% of the trips averaged over all peak periods use Marsh Road to US 101 (Zone 15). This percentage of trips is higher during the a.m. peak period compared to the school p.m. and p.m. peak periods.
- c) Approximately 6% of the trips averaged over all peak periods use Fair Oaks Lane to El Camino Real (Zone 9). This percentage of trips is higher during the school p.m. and p.m. peak periods compared to the a.m. peak period.



- d) The remaining captured trips use local streets to the remaining destination zones as shown in **Figure 11**.

Routes originating from Origin Zone 12 (Figure 12):

- a) Majority of trips captured at Origin Zone 12 pass through the Town via destination Zone 11. This constitutes for approximately 60% of the captured trips at Zone 12 averaged over all peak periods. The percentage of pass through trips during the a.m. and p.m. peak periods are higher than the school p.m. peak period.
- b) Approximately 11 % during the a.m. peak period and 18% of the trips during the school p.m. and p.m. peak periods divert on to El Camino Real (Zone 8) via local streets.
- c) The remaining captured trips use local streets to the remaining destination zones as shown in **Figure 12**.

Zones 14 and 15 were evaluated as origin zones to ascertain whether trips from US 101 were diverting in to the Town of Atherton and using local streets as cut-through.

Routes originating from Origin Zone 14 (Figure 13):

- a) Trips originating from Zone 14 are captured in small percentages at all the destination zones. The majority of captured trips indicate a potential stop within the Town before leaving the Town and were not considered as cut-through trips.
- b) Captured trips that indicate potential cut-through routes include the following:
- Approximately 7% of captured trips averaged over all peak periods at Zone 14 use Marsh Road to El Camino Real (Zone 9).
 - Approximately 7% of captured trips averaged over all peak periods at Zone 14 use Marsh Road to Middlefield Road (Zone 12).
 - Approximately 6% of captured trips averaged over all peak periods at Zone 14 use Bay Road to US 101 (Zone 15).

Routes originating from Origin Zone 15 (Figure 14):

- a) Trips originating from Zone 15 are captured in small percentages at all the destination zones. Majority of the captured trips indicate a potential stop within the Town before leaving the Town and were not considered as cut-through trips.
- b) Captured trips that indicate potential cut-through routes include the following:
- Approximately 13% of captured trips averaged over all peak periods at Zone 15 use Marsh Road to El Camino Real (Zone 8).
 - Approximately 26% of captured trips averaged over all peak periods at Zone 14 use Marsh Road to Middlefield Road (Zone 11). Out of the 26% using Marsh Road, 8% join Marsh Road via Bay Road.



3. SHORT-TERM AND LONG-TERM RECOMMENDATIONS

TJKM obtained the VTA/C-CAG Model for the Town of Atherton for base Year 2010 and Year 2040 to project short-term Year 2025 and long-term Year 2040 traffic demands. The traffic demands were compared to existing and historical average daily traffic and intersection turning movement counts to ascertain if the projected demands could be incorporated under existing capacity. It was observed that the Alameda De Las Pulgas, Valparaiso Avenue and Middlefield Road corridors are currently at capacity. Hence, recommendations were based on existing constrained traffic volumes.

As discussed in previous sections, most unsignalized study intersections operate at unacceptable LOS F. TJKM conducted peak hour signal warrant analysis at all study intersections to ascertain where installation of traffic signal is warranted. The following intersections met the peak hour traffic signal warrant analysis.

- Alameda De Las Pulgas/Atherton Avenue
- Valparaiso Avenue/Emilie Avenue
- Valparaiso Avenue/Elena Avenue
- Middlefield Road/Fair Oaks Lane-Palmer Lane
- Middlefield Road/Watkins Avenue

Additionally, TJKM conducted collision analysis at the study intersections and observed that majority of broadside and rear-end accidents during 2017 and 2018 occurred at Middlefield Road/Watkins Avenue.

Based on the analysis conducted, the following short-term and long term recommendations have been proposed.

Alameda De Las Pulgas/Atherton Avenue

Alameda De Las Pulgas experiences 89% & 60% southbound (SB) & northbound (NB) pass-through traffic respectively averaged over all peak periods. The a.m. and p.m. peak direction of travel is SB and NB respectively with stop-and-go traffic conditions during the a.m. peak hour with limited gaps for conflicting left-turns on major street and side-street left-turn movements. Alameda De Las Pulgas/Atherton Avenue acts as the controlling intersection along Atherton Avenue. This intersection operates at LOS F during all peak periods and meet peak hour signal warrants. Atherton Avenue experiences cut-through traffic between Alameda De Las Pulgas and El Camino Real as provided on **Table 9** below:

Table 9: Cut-through Traffic along Atherton Avenue

<i>Direction</i>	<i>AM</i>	<i>School PM</i>	<i>PM</i>
EB	19% (92)	6% (20)	12% (37)
WB	13% (97)	10% (67)	15% (153)

Note: Percentage % (No. of Vehicles)

TJKM proposes the following recommendations at this intersection to improve operations and reduce cut-through and pass-through traffic along the corridor.

1. Provide Left-Turn restrictions from Alameda De Las Pulgas onto Stockbridge Avenue and Polhemus Avenue during the a.m. peak period.



2. Signalization of Alameda De Las Pulgas/Atherton Avenue.
3. Square-out intersection by removing existing pork-chop and adding an exclusive right-turn lane making it safer for all modes of transportation.
4. Provide protected left-turn phasing along Alameda De Las Pulgas with westbound right-turn overlap for Atherton Avenue.
5. Metering traffic upon signalization to deter pass-through traffic.



With signalization of Alameda De Las Pulgas/Atherton Avenue, the intersection would operate at LOS C during all peak periods. Installing a roundabout was also analyzed at the intersection but due to right-of way (ROW) constraints and need of property acquisition this would not be a viable option at this time.

TJKM also evaluated additional traffic calming improvements along Atherton Avenue corridor as follows:

1. Installation of Class II Bike Lanes in one direction along Atherton Avenue.
2. Rumble Strips on center median.
3. Speed Tables.
4. Bulb-outs.

However, upon discussion with town staff, rumble strips, bulb-outs and speed tables would hinder the mobility of the Menlo Fire Department during emergencies and hence were not considered as viable options.



Valparaiso Avenue

Valparaiso Avenue connects Alameda De Las Pulgas to El Camino Real. The peak direction of travel during the a.m. and p.m. peak period is eastbound and westbound direction respectively with stop-and-go traffic conditions during the a.m. peak period with limited gaps for conflicting left-turns on major street and side-street left-turn movements.

This corridor experiences cut-through traffic from El Camino Real and Alameda De Las Pulgas. The cut-through traffic percentage along this corridor is provided on **Table 10** below.

Table 10: Cut-through Traffic on Valparaiso Avenue

<i>Direction</i>	<i>AM</i>	<i>School PM</i>	<i>PM</i>
EB	13% (138)	18% (170)	6% (50)
WB	26% (188)	15% (161)	8% (73)

Note: Percentage % (No. of Vehicles)

The intersections of Valparaiso Avenue/Emilie Avenue and Valparaiso Avenue/Elena Avenue operate with LOS F during all study peak periods. These intersections meet peak hour signal warrants, but achieving acceptable level of service would require exclusive left-turn lanes along with the signalization which would require additional ROW. Due to ROW constraints this would not be a viable option at this time.

TJKM proposes the following recommendations to improve operations and reduce cut-through and pass-through traffic along the corridor of Valparaiso Avenue:

1. One-way circulation loop between Elena Avenue and Emilie Avenue.
2. Town may need to work with City of Menlo Park analyze the intersection of Alameda De Las Pulgas/Valparaiso Avenue and provide turn restrictions.
3. Rumble Strips on center median.
4. Speed Tables.
5. Bulb-outs.

However, upon discussion with the City Staff, rumble strips, bulb-outs and speed tables would hinder the mobility of the Menlo Fire Department during emergencies and hence were not considered as viable options.



Middlefield Road

Middlefield Road experiences 56% & 60% southbound (SB) & northbound (NB) pass-through traffic respectively averaged over all peak periods. The a.m. and p.m. peak direction of travel is SB and NB respectively with stop-and-go traffic conditions during the a.m. peak hour with limited gaps for conflicting left-turns on major street and side-street left-turn movements. Intersections of Middlefield Road/Fair Oaks Lane, Middlefield Road/Marsh Road and Middlefield Road/Oak Grove Avenue act as the controlling intersection along this corridor. These intersections operate at LOS F during all peak periods. Intersection of Middlefield Road/Fair Oaks Lane and Lane Middlefield Road/Watkins Avenue are unsignalized intersections along the corridor and meet peak hour signal warrant analysis.

TJKM proposes the following recommendations along Middlefield Road to improve operations and reduce cut-through and pass-through traffic along the corridor.

1. Signalization of Middlefield Road/Fair Oaks Lane and Middlefield Road/Watkins Avenue.
2. Improve signal timings along Middlefield Road by updating the coordination plans through the corridor.
3. Provide Northbound Left-Turn restrictions from Middlefield Road onto Glenwood Avenue during the a.m. peak period
4. Meter the traffic along the corridor at controlling intersections like Middlefield Road/Fair Oaks Lane, Middlefield Road/Marsh Road and Middlefield Road/Oak Grove Avenue to deter pass-through as well as cut-through traffic.

4. STREET CLASSIFICATION RECOMMENDATIONS

This section provides recommendations concerning potential updates to the town’s street classification designations (and related standards) to incorporate complete streets and context-sensitive design principals as part of the upcoming update to the Atherton *General Plan*. California planning law mandates that the Circulation Element must contain the “general location and extent of existing and proposed major thoroughfares, transportation routes, and other local public utilities and facilities, all correlated with the land use element of the General Plan per Government Code Section 65302 (b). In addition, the General Plan must incorporate “Complete Streets” policies, as described below.

PURPOSE OF PROPOSED STREET CLASSIFICATION CHANGES

As described in this report: the existing *Atherton General Plan* street classification system (most recently adopted in 2002 but most likely much older) focuses entirely on the function of each street for purposes of accommodating motor vehicle travel. Atherton’s street classifications do not yet describe the role of each street for purposes of bicycle, pedestrian or transit travel, nor do the town’s street and right-of-way standards include provision of bicycle lanes or pedestrian paths. Thus it is not entirely surprising that school-related traffic concerns have arisen, given the lack of facilities for walking or bicycling to school.

In addition: Atherton’s current classifications do not match that of adjacent jurisdictions for several key street. El Camino Real is classified as a highway by the Town of Atherton, but classified as a boulevard (major arterial) by the City of Menlo Park. Similarly, Valparaiso and Ravenswood Avenue are classified as collector streets by Atherton, while Menlo Park classifies both as minor arterials.

The Atherton *General Plan* update thus provides an opportunity for Atherton to refine its functional street classifications and general street design standards to account for bicycle, pedestrian and transit travel. In recent years many cities and towns have modernized their street classifications to include specific multi-modal components, often by adding additional sub-classifications to each of the arterial-collector-local classifications, and specifying desired levels of pedestrian, bicycle, motor vehicle, and transit access for each classification and/or sub-classification.

Complete Streets Act

The term “Complete Streets” refers to a balanced, multimodal transportation network that meets the needs of all users of streets -- including bicyclists, children, persons with disabilities, motorists, movers of commercial goods, pedestrians, public transportation, and seniors. A “Complete Street” is one that provides safe and convenient travel in a manner that is suitable to the local context.



The California Complete Streets Act (AB 1358) adopted in 2008 requires that cities and other public agencies incorporate “complete street” policies when updating their General Plan Circulation Element, to ensure that Complete Streets principles are



incorporated. The current *Atherton General Plan* Circulation Element was adopted in 2002, prior to the Complete Streets Act.

PROPOSED STREET CLASSIFICATION CHANGES

Revise the definitions of each street classification as follows, including the creation of context-specific sub-classifications of collector streets and local streets that provide school access. As proposed below:

- The definitions of each functional classification would be updated to describe the role of each classification for serving all key modes of travel: bicycle, motor vehicle, pedestrian and transit. This would include defining the relative travel mode priorities for each classification.
- The general street design standards accompanying each classification would be updated to incorporate complete street components where relevant.
- The “freeway and highway” classification that is currently applied to El Camino Real would be eliminated and replaced with a new classification titled “boulevard”, consistent with the City of Menlo Park designation for El Camino Real and also supportive of the regional Grand Boulevard initiative. The “boulevard” classification would be defined as being a type of “primary arterial” street.
- The designation of both Valparaiso and Ringwood Avenues would be changed from collector to avenue (minor arterial), consistent with the classification of both streets by the City of Menlo Park.

PROPOSED FUNCTIONAL CLASS DEFINITIONS

As proposed, the definitions of each functional classification would be revised to state the following (including the proposed new classifications):

- **Boulevards.** Boulevards are Major Arterial streets that serve as key regional mobility routes connecting Atherton and adjacent cities both north and south. Boulevards are designed to accommodate higher traffic volumes and frequent transit service in order to discourage the use of parallel streets by cut-through traffic. Intersections with arterial and collector streets should be signalized, and signalized pedestrian crossings (such as pedestrian hybrid signals) should be provided at intersections with local streets that provide school access. Measures to improve access to transit stops via bicycle and/or walking should be provided. Provision of a Class I bicycle and pedestrian path, or buffered bicycle lanes (or Class IV separated bikeway treatments) should be provided if feasible as a desirable long-term improvement to enhance multi-modal connectivity and provide additional alternatives to vehicle cut-through traffic.
- **Minor Arterial Streets.** Arterials provide the principal network for citywide travel by all modes of travel, including walking, bicycling, motor vehicle and transit, and provide regional connections. Minor arterial streets in Atherton generally have one motor vehicle travel lane per direction and should include bicycle lanes in both directions, and pedestrian paths on both sides. Traffic signals or roundabouts should be with provided where warranted at intersections with boulevards and collector streets.
- **Collector Streets.** Collectors provide connections for all modes of travel between neighborhoods and activity centers, as well as providing direct access to land uses. Collectors also provide connections

between arterial and local streets. Collector streets in Atherton have one motor vehicle travel lane per direction. Collector streets should include Class II bicycle lanes or Class III (signed bicycle route with sharrow markings indicating shared travel lanes with motor vehicles) in both directions, and pedestrian paths on at least one side.

- **School Collectors** are collector streets residential frontages that provide direct access to schools and prioritize school access and encourage walking and bicycling. Pedestrian paths should be provided along at least one side of each school collector street.
- **Transit Collectors** are collector streets that serve a similar role as other collector streets while also providing access to transit stations and/or transit stops. This designation emphasizes the needs of transit access via all modes. Increased provisions for pedestrian, bicycle and bus access to transit stations and/or transit stops should be provided where feasible.
- **Local Streets.** Local streets provide direct access to abutting properties by all modes of travel. All streets that are not designated as arterials or collectors are local streets. Bicycle facilities on local streets generally consist of shared travel lanes between motorists and bicyclists. Most local streets in Atherton are “shared streets” in which motor vehicles, bicycles and pedestrians share the travel way, without provision of separate lanes or sidewalks.
- **School Access Lanes.** School access lanes are local streets that provide direct access to schools. Measures to enhance walking and bicycling to school should be prioritized, including the provision of pedestrian paths.

Tables 11 and 12 further describe each street classification. **Figure 15** provides a map of the proposed street classifications for each segment incorporating the recommended changes.



As proposed in this section: Middlefield Road would remain classified as a Minor Arterial but the updated classifications would be revised to recommend provision of pedestrian paths adjacent on Minor Arterials.



Table 11: Arterial Street Guidelines (Proposed)

Proposed Classification	Proposed Travel Mode Priorities	Proposed Guidelines	Applicable Streets	FHWA Category
Boulevard	Bicycle: ② Motorist: ① Pedestrian Crossings: ① Transit: ① Walking to Transit: ①	<p><i>Major arterial that serves high volumes of regional motor vehicle traffic and frequent transit service, and provides access to collector and local streets. Direct access to adjacent land uses is discouraged on boulevards within Atherton.</i></p> <p><i>Accommodates regional vehicle trips in order to discourage such trips on other roadways in Atherton.</i></p> <p><i>Supports high levels of transit service and ridership to reduce regional traffic volumes. Provides bicycle and pedestrian access to transit stops, and enhanced pedestrian crossings. Provision of measures to reduce bus delay should be prioritized.</i></p> <p><i>Installation of Class 4 Separated Bikeway treatment should be considered as a long-term improvement.</i></p>	El Camino Real*	Primary Arterial
Minor Arterial	Bicycle: ① Motorist: ① Transit: ① Walking: ①	<p><i>Streets with residential frontages in Atherton that serve multiple travel modes, connect with destinations outside of Atherton, and provide access to boulevards, collectors, and local streets as well as adjacent land uses.. Bicycle lanes, pedestrian paths and pedestrian crossing improvements to enhance access to schools and transit stops should be provided where feasible.</i></p>	Middlefield Road Alameda de las Pulgas Marsh Road Valparaiso Avenue** Ravenswood Avenue**	Minor Arterial
① = High Priority ② = Medium Priority ③ = Low Priority				

*El Camino Real is currently classified as a highway by the Town of Atherton, and as a boulevard (major arterial) within Menlo Park. As proposed above: adoption of a boulevard (major arterial) classification by the Town of Atherton would support regional efforts related to the Grand Boulevard initiative.

** Valparaiso Avenue and Ravenswood Avenue are currently classified as collector streets by the Town of Atherton, but classified as avenues (minor arterials) by the City of Menlo Park. Reclassifying both streets as minor arterials within Atherton would provide a consistent classification while also addressing a lack of east/west arterial connections within Atherton.



Table 12: Collector & Local Street Guidelines (Proposed)

Proposed Classification	Proposed Travel Mode Priorities	Proposed Guidelines	Applicable Streets	FHWA Category
Collector Street	Bicycle: ❶ Motorist: ❶ Transit: ❸ Walking: ❶	<i>Collector streets connect arterial and local streets while also providing direct access to adjacent land uses. Collector streets should balance the needs of bicyclists, motorists and pedestrians.</i>	Atherton Avenue	Collector
Transit Collector	Bicycle: ❶ Motorist: ❷ Transit: ❶ Walking: ❶	<i>Transit Collectors serve a similar role as other collector streets while also increasing provisions for pedestrian, bicycle and bus access to major transit stops. Would also aim to support efforts to restore weekday service to the Atherton Caltrain Station.</i>	Fair Oaks Lane	Collector
School Collector	Bicycle: ❶ Motorist: ❷ Transit: ❶ Walking: ❶	<i>Collector streets with primarily residential frontages that provide direct access to schools and prioritize school access and encourage walking and bicycling.</i>	Ringwood Avenue Encinal Avenue	Collector
School Access (Local)	Bicycle: ❶ Motorist: ❷ Transit: ❸ Walking: ❶	<i>Local streets that provide direct local access to schools. Measures to enhance walking and bicycling to school should be prioritized.</i>	Selby Lane Emile Avenue	Local
Local Street	Bicycle: ❷ Motorist: ❷ Transit: ❸ Walking: ❷	<i>Local streets that provide direct access to properties.</i>		Local
❶ = High Priority ❷ = Medium Priority ❸ = Low Priority				



Recommended Changes to General Street Design Standards

The recommended general standards for street right-of-way and improvements, incorporating the functional classifications described above, are shown on **Table 13** below.

Table 13: Proposed General Street Design Standards

<i>Functional Classification</i>	<i>Right-of-Way Width</i>	<i>Minimum Roadway Width¹</i>	<i>Number of Motor Vehicle Lanes</i>	<i>Pedestrian Path Width²</i>	<i>Bicycle Lane</i>	<i>Desired Traffic Capacity (ADT)</i>
Boulevard	120 feet	Varies	4 to 6	6 to 10 feet	6 feet	<40,000
Minor Arterial	60 feet	32 feet including bicycle lanes	2	6 feet	5 feet	10,000 to 25,000
Collector	50 feet	24 feet, or 32 feet with bicycle lanes	2	4 to 6 feet	5 feet	2,500 to 12,000
School Collector	50 feet	32 feet including bicycle lanes	2	6 feet	5 feet	2,500 to 12,000
Transit Collector	50 feet	32 feet including bicycle lanes	2	4 to 6 feet	5 feet	2,500 to 12,000
School Access Lane (Local Street)	40 feet	20 feet	2	6 feet	Not applicable	<1,000
Local	40 feet	20 feet	2	4 to 6 feet	Not applicable	<1,000

- Notes: 1. Roadway width includes bicycle lanes, median width and on-street parking where applicable.
 2. Recommend long-term provision of pedestrian paths on both sides of arterial streets, and on at least one side of school collector streets, transit collector streets, and school access lanes.



5. TRANSPORTATION IMPACT CRITERIA RECOMMENDATIONS

This section provides recommendations concerning changes to Atherton’s criteria for evaluating transportation impacts.

Proposed projects when subject to the California Environmental Quality Act (CEQA), to be evaluated to determine if they result in significant environmental impacts. Such projects may be located either in Town or in another jurisdiction where the project could have an impact on transportation conditions in Atherton.

CURRENT TOWN OF ATHERTON CRITERIA FOR TRANSPORTATION IMPACTS

Impact criteria refers to the thresholds identified for purposes of evaluating significant transportation impacts when evaluating development projects (when subject to CEQA requirements) and other public agency decisions (if deemed a “project” under CEQA).

Traffic Impacts: Motor vehicle traffic impacts in Atherton are currently based on intersection level of service (LOS). The Town of Atherton has recently identified the following proposed minimum acceptable intersection LOS standards:

- Highways will operate at a minimum LOS E (C/CAG adopted standard)
- Minor arterials and collector streets will operate at a minimum LOS D
- Local Streets will operate at a minimum LOS C

When SB 743 takes effect (anticipated by mid-2020, as described on the following pages), the use of LOS will no longer be allowed under CEQA for purposes of evaluating traffic impacts. Nonetheless, cities and towns may continue to utilize LOS for other planning purposes, and many cities and towns will continue to have an adopted LOS standard identified in their *General Plan* Circulation Elements.

Similar to most California cities: Atherton does not yet have an adopted threshold for evaluating impacts to vehicle miles traveled (VMT).

Bicycle & Pedestrian Impacts: the town has not adopted criteria for evaluating bicycle and pedestrian impacts. Nonetheless, impacts to bicycling and walking would be considered significant based on standard CEQA checklist criteria if a project were to conflict with an adopted bicycle or pedestrian plan, including the *Atherton Bicycle & Pedestrian Plan* and the *Countywide Bicycle & Pedestrian Plan*.

Transit Impacts: the town has not adopted criteria for impacts to public transit. In jurisdictions where transit impact criteria has been adopted, criteria typically focuses on identifying transit impacts as significant in cases where a project would generate substantial ridership demand for transit service in an area not adequately served by public transit; and/or transit impacts would be significant if a project were to result in increased delay to public transit vehicles that would result in increased transit operating costs.



SB 743 & VEHICLES MILES TRAVELED (VMT)

The California legislature passed Senate Bill (SB) 743 in 2013 that requires changes to the California Environmental Quality Act (CEQA) regarding the analysis of transportation impacts. Transportation impact criteria and Circulation Element performance standards in most cities have typically focused on motor vehicle level of service (LOS) as the primary criterion. LOS is an analysis methodology that assesses the performance of roadways based on average motor vehicle delay at intersections.

SB 743 required the Governor's Office of Planning and Research (OPR) to amend the CEQA Guidelines to provide a revised method to LOS for evaluating transportation impacts. OPR recommended that vehicle miles travelled (VMT) replace LOS as the primary transportation performance metric for evaluating environmental impacts statewide.

The preferred methodology, which is still subject to ongoing discussions statewide, would quantify VMT on a "per capita" basis, based on the local population of residents and jobholders. Local VMT thresholds are anticipated to be based on regional averages for per-capita VMT. Key recommendations described in the OPR guidelines include:

- Vehicle miles traveled is to be the primary performance metric for evaluating transportation impacts across California.
- Land use development near transit or in VMT-efficient areas should be presumed to cause a less than significant transportation impact.
- Transit, active transportation, and rehabilitation projects that do not add motor vehicle capacity should also be presumed to cause a less than significant impact.
- Implementation should be phased in over time.

RECOMMENDED CRITERIA

This section provides recommendations concerning updated transportation impact criteria. The recommend impact criteria language by transportation topic is shown below.

Vehicle Miles Traveled (VMT) Impacts

A project would result in potentially significant impacts to vehicle miles traveled (VMT) if project VMT per capita (i.e., per resident and/or per employee) would exceed 85 percent of existing VMT per capita for the region.

*Note: each jurisdiction has discretion in selecting an appropriate "region" to define for purposes of defining a VMT impact threshold 15 percent below the selected regional average. The majority of cities, towns and counties in California have not yet adopted VMT criteria, and it may be advisable for the Town of Atherton to consult with other jurisdictions in San Mateo County prior to settling on a specific threshold. As one example, **Table 14** shows the adopted VMT thresholds identified by the City of San Francisco for specific land use types (residential, office and retail). Land uses in San Francisco tends to generate less than half the rate of VMT compared to regional averages - for example: San Francisco households generate just 8.4 daily vehicle miles per resident, compared to the regional average of 17.2 miles per resident). However, new development in the Atherton area tends to generate VMT at a rate similar to regional averages.*



Table 14: VMT Regional Criteria Example: City of San Francisco

Land Use	Bay Area Region	
	Regional Average	85% of Regional Average
Residential (per resident) ¹	17.2	14.6
Office (per employee) ²	19.4	16.2
Retail (per employee) ²	14.9	12.6

Notes:

1. Average daily VMT per resident includes vehicle miles generated by non-residents (i.e. visitors, deliveries, etc.)
2. Average daily VMT per employee includes vehicle miles by non-employees (i.e., visitor trips including customers and deliveries, etc.)

Source: San Francisco Planning Department, *Resolution Modifying Transportation Impact Analysis*, March 3, 2016.

Bicycle and Pedestrian Impacts

Impacts to bicycle and pedestrian travel would be potentially significant if:

- A project would not provide adequate pedestrian or bicycle facilities to connect to the area circulation system; or
- Vehicles would cross pedestrian facilities on a regular basis without adequate design and/or warning systems, causing safety hazards; or
- Project design would cause increased potential for bicycle/vehicle conflicts; or
- A project would include elements that conflict with applicable bicycle and pedestrian policies.

Transit Impacts

Impacts to public transit would be potentially significant if:

- A project would generate a substantial increase in transit riders that cannot be adequately serviced by the existing transit services; or
- A project would generate demand for transit services in an area that is more than one-quarter mile from existing transit routes; or
- A project would include elements that conflict with applicable transit policies; or
- A project would cause a substantial increase in transit delays or transit operating costs such that significant adverse impacts in transit service levels could result

Emergency Access Impacts

Impacts would be potentially significant if a project were to result in inadequate emergency access.

RECOMMENDED INTERSECTION LEVEL OF SERVICE (LOS) GOALS

As noted above: intersection LOS will no longer be an acceptable CEQA criterion for purposes of identifying environmental impacts following statewide implementation of SB 743. Nonetheless, jurisdictions may still adopt LOS goals for non-CEQA planning purposes. The recommended LOS goals below take into account the Town of Atherton’s goals for most streets (with the exception of El Camino



Real) to consist of just one through lane per direction. Therefore, as proposed below, LOS D would be acceptable on minor arterial or collector streets:

- **El Camino Real intersections.** LOS E or better
- **Minor Arterial Intersections.** LOS D or better
- **Collector intersections:** LOS D or better
- **Local street intersections:** LOS C or better
- **Side-street Stop-controlled Intersections.** LOS standards at side-street stop-controlled intersections shall not apply to approaches that do not warrant signal installation.



Appendix A – Traffic Counts

- ADT and Speed Counts
- Turning Movement Vehicles, Bicyclists and Pedestrian Counts



Appendix B – Origin-Destination Study Data



Appendix C – Existing Conditions Synchro & SimTraffic Reports

- HCM Delay and LOS Reports
- 95th Percentile Queue Length Reports