REPORT TO MAYOR AND COUNCIL **NO: 12-279**

Council Meeting: December 4, 2012

SUBJECT: Discussion and Possible Action Regarding Comprehensive School Traffic Study - STUDY ISSUE

BACKGROUND

The City Council approved a 2012 study issue to prepare a Comprehensive School Traffic Study (Attachment A – Study Issue DPW 09-01). This study per Council's revised direction as part of the 2012 budget issues process, focuses on evaluation of school traffic in Sunnyvale from an operational perspective and identifies potential traffic control improvements. The study identifies whether a set of actions exists beyond current traffic controls to improve school zone traffic flow and enhance pedestrian safety. The study maps school routes for Sunnyvale public elementary and middle schools per the California Manual of Uniform Traffic Control Devices (CA-MUTCD) methodology, and evaluates all school route intersections. Data inputs include existing intersection traffic control and approach signing and markings, traffic volume, collision information, speed limits, and roadway classification. Intersection improvement options are then developed using criteria based on guidance and requirements developed from a number of sources, including the (CA-MUTCD), the National Center for Safe Routes to Schools, and examples from other municipalities. The study presents recommendations for nine different types of traffic control modifications to improve pedestrian and bicycling conditions for school age travelers at all City public elementary and middle schools. Over 200 locations are recommended for further detailed evaluation (Attachment B).

This study is separate from a joint Council of Santa Clara Health Department/City of Sunnyvale project to evaluate travel behavior and interface with school administrations and parent groups to develop Transportation Demand Management (TDM) programs for City schools. This multi-year effort has a goal to establish school TDM programs in 80% of Sunnyvale schools.

EXISTING POLICY

Land Use and Transportation Chapter, LT-5.4g Conduct periodic analyses of roadway facilities and collision data in order to assure traffic safety.

Land Use and Transportation Chapter, LT-5.4b Install permanent and painted pavement markings.

Land Use and Transportation Chapter, LT-5.3d Make appropriate hardware and software improvements to traffic signals.

DISCUSSION

The comprehensive school traffic study issue considers new or enhanced traffic controls and pedestrian or bike features on school routes (Attachment C). The methodology is based on school route maps that illustrate existing controls and features and applying in a Geographic Information Systems-based query format a comprehensive set of data on traffic volume, safety, and controls on a school-specific basis. Criteria have been established to determine locations for subsequent detailed engineering evaluation for the installation of new or enhanced traffic devices (controls, warning signs, lighted crosswalks, paddle signs, enhanced striping, etc.). These maps will be used to guide future detailed study and implementation of controls, and also for scoping of possible future Safe Routes to School or other grant applications to implement traffic improvements.

The study considers nine different types of school area traffic control improvements. These are listed below and some examples are illustrated in Attachment D:

1. Rectangular rapid flashing beacons
2. In pavement lighted crosswalks
3. Raised crosswalks/traffic calming
4. Marked/improved crosswalks at uncontrolled intersections
5. High visibility crosswalks at Yield controlled intersections
6. Stop control and improved crosswalks at marked crosswalks
7. Marked crosswalks at Stop controlled intersections
8. Improved traffic signals
9. Fifteen mile per hour school zones

The criteria developed for determining traffic control improvement recommendations contains some flexibility in making recommendations for crosswalk and traffic signal improvements. Depending upon the conditions cited for making a recommendation, the study makes a range of conservative to liberal options for the recommendations on the marking of crosswalks and improvement of existing traffic signals. For example, when considering whether to mark crosswalks at stop controlled intersections along school routes, the study identifies five different criteria for installation. These range from proximity (mark crosswalks at all stop controlled intersections within ½ mile of a school), to traffic volume (mark if volume is over 2,000 vehicles/day, VPD), to collision history and street classification, to marking of only three and four-way controlled intersections with a higher traffic volume (2,000 VPD). The result are options for marking high visibility crosswalks at a range of locations from two intersections to 257 intersections. Staff intends to apply the study results by conducting more detailed investigations beginning with the more conservative criteria results and moving to the more liberal. Location-specific investigations and judgments will need to be made to balance the in-the-field conditions with the resources available to install and maintain traffic controls.

The Comprehensive School Traffic Study provides a focused framework for moving forward on making school area traffic control improvements. It is anticipated that location specific investigations will advance over the next year utilizing funds approved by the City Council and contracting for professional services to conduct location-specific studies. Installation of improvements will primarily occur with grant funds that are pursued and secured based on completion of location-specific studies and development of competitive projects. Some items will be "just do it" items within the existing resources of the City and justified by the Comprehensive School Traffic Study, such as limited signing and striping improvements like crosswalks, yield bars, and warning signs. Existing operating budgets likely cannot cover the cost of widespread signing and striping improvements in the near term, however. Items such as higher cost lighted systems and traffic signal systems will require grant resources.

15 Mile Per Hour School Zones

At its February 28, 2012 meeting, the City Council considered the blanket establishment of 15 mile per hour school zones at qualifying locations per State law and acted not to enact the zones Citywide. This action still remains in the toolbox of school traffic controls, however. State law was modified in 2008 to allow local jurisdictions the authority to establish 15 mile per hour speed zones near schools. This is a certain exception in the California Vehicle Code (CVC) to the required method for establishing speed limits. Local authorities may adopt 15 mile per hour school area speed zones adjacent to schools in residential areas and on streets where the posted speed limit is 30 miles per hour or less. Reduced speeds can lower the rate and severity of collisions. An ordinance or resolution must be approved in support of creation of the 15 mile per hour zones

Staff has developed a criterion as part of the Comprehensive School Traffic Study to allow consideration of 15 mile per hour zones on those qualifying street segments that have documented higher traffic speeds. The criterion proposed is for those school area streets that have an 85 percentile speed greater than 25 miles per hour during school commute times, establishment of a 15 mile per hour zone would be recommended. Staff would utilize this criterion by conducting speed surveys to determine which school area streets are experiencing high traffic speeds, and may warrant corrective action. Any change in speed limits would still require Council action by resolution.

Bicycle and Pedestrian Advisory Commission Recommendation

The Sunnyvale Bicycle and Pedestrian Advisory Commission considered this item at its November 15, 2012 meeting and recommended that the City Council support the staff recommendation. During their discussion of the item, a BPAC member requested that the report be shared with school administrators. Staff will follow up to assure this happens.

FISCAL IMPACT

Additional detailed study of locations will be done utilizing funding approved for preparation and implementation of the Comprehensive School Traffic Study. Implementation of traffic control modifications will be done within the confines of the Public Works operating budget, augmented by grant funding as it is secured for future school traffic safety projects.

PUBLIC CONTACT

Public contact was made by posting the Council agenda on the City's official-notice bulletin board outside City Hall, at the Sunnyvale Senior Center, Community Center and Department of Public Safety; and by making the agenda and report available at the Sunnyvale Public Library, the Office of the City Clerk and on the City's Web site.

The Bicycle and Pedestrian Advisory Commission held a public hearing on a draft Report to Council at its November 15, 2012 meeting (Attachment E – Draft meeting minutes).

ALTERNATIVES

1. Accept the Comprehensive School Traffic Study and direct staff to implement the study results.

2. Do not accept the Comprehensive School Traffic Study and direct staff to conduct additional analysis.

3. Do not accept the Comprehensive School Traffic Study and take no further action.

RECOMMENDATION

Staff and the Bicycle and Pedestrian Advisory Commission recommend Alternative No. 1: Accept the Comprehensive School Traffic Study and direct staff to implement the study results.

The Comprehensive School Traffic Study provides a useful tool for planning and implementing school area traffic control improvements, and positioning the City for future grant funding opportunities for school traffic safety projects.

Reviewed by:

Kent Steffens, Director, Public Works
Prepared by: Jack Witthaus, Transportation and Traffic Manager

Approved by:

Gary M. Luebbers
City Manager

Attachments

A. Study Issue DPW 09-01 Comprehensive School Traffic Study
B. Summary of Study Recommendations
C. Comprehensive School Traffic Study
D. School Traffic Control Devices
E. Draft Bicycle and Pedestrian Advisory Commission Meeting Minutes of November 15, 2012

2012 Council Study Issue

DPW 09-01 Comprehensive School Traffic Study (Combined SI's School TDM Opportunities & School Zone Traffic Controls and Enforcement)

Lead Department Public Works

History **1 year ago** Deferred **2 years ago** Above the line

1. **What are the key elements of the issue? What precipitated it?**

This issue would comprehensively investigate and evaluate school traffic in Sunnyvale from both an operational and programmatic perspective. Three primary areas will be assessed: Transportation Demand Management (TDM), traffic controls, and traffic enforcement. Travel patterns and vehicle and pedestrian conditions at schools, including mode choice, alternative transportation resources, pedestrian patterns, location of pedestrian facilities (especially crosswalks), driving behaviors (especially speeding, right of way compliance and illegal turns), and speed controls will be assessed. For TDM, the study would look at appropriate levels of resources for the City to invest in encouraging effective TDM for schools within the City. The study would look at interfaces between school district and City operations, and opportunities for the City to invoke regulations or encourage TDM to school commuters. The outcome of the TDM evaluation would be recommendations for policy, actions, and resources for a transportation demand management program targeted at City schools. For traffic controls and enforcement, the study would identify whether a set of actions exists beyond current traffic controls and enforcement resources to improve school zone traffic flow and enhance pedestrian safety. This study would include a review of the applicability of CVC 22358.4 provisions regarding lowering of speed limits in school areas. The purpose of the study is to consider concerns that school area loading and unloading is chaotic in many areas and that a high proportion of parents drive their children to school. TDM, additional controls and/or enforcement may improve efficiency and safety.

As per Council action at the January 29, 2010 Study Issues Workshop, this study is the result of merging DPW 09-01, School Transportation Demand Management Opportunities, and DPW 10-08 School Zone Traffic Controls and Enforcement.

2. **How does this relate to the General Plan or existing City Policy?**

Land Use and Transportation Element Goal C3, Attain a transportation system that is effective, safe, pleasant and convenient.

3. **Origin of issue**

Council Member(s) Hamilton, Howe

Board or Commission

4. ***Staff effort required to conduct study*** Major

Briefly explain the level of staff effort required
This study would involve a citywide, school by school analysis of three significant topic areas - programmatic traffic demand actions, engineering/traffic control actions, and enforcement actions. Considerable field investigations, design efforts, and study of operating protocols would be involved. Siginficant coordination with school districts, individual schools, PTA's and other

stakeholders would be necessary. Such a comprehensive effort would require staffing augmentation by consultants and involvement of staff from several disciplines.

5. **Multiple Year Project?** Yes **Planned Completion Year** 2013

6. **Expected participation involved in the study issue process?**

Does Council need to approve a work plan?	No
Does this issue require review by a Board/Commission?	Yes
If so, which?	Bicycle and Pedestrian Advisory Commission
Is a Council Study Session anticipated?	No

7. **Briefly explain if a budget modification will be required to study this issue**

Amount of budget modification required 500000

Explanation
A total of 28 schools would be targeted by the study. Staff estimates 200 consultant hours per school would be required for data collection, meetings with stakeholders, and development of school-specific action plans. A budget modification of approximately $500,000 would be required. There would be staff time implications to the Department of Public Works and the Department of Public Safety.

8. **Briefly explain potential costs of implementing study results, note estimated capital and operating costs, as well as estimated revenue/savings, include dollar amounts**

Are there costs of implementation? Yes

Explanation
Should a TDM program be adopted, this could involve capital improvements to direct traffic or improve alternative transportation routes to schools. An ongoing program involving elements such as ridematching, walking school buses, or bike safety courses would require resources to manage the program, provide educational and promotional materials, etc. This study could also result in recommendations for new traffic controls at schools Citywide. This could represent a capital investment of considerable scope. The study could also result in recommendations for additional traffic enforcement or crossing guard resources, which can have a significant operating cost.

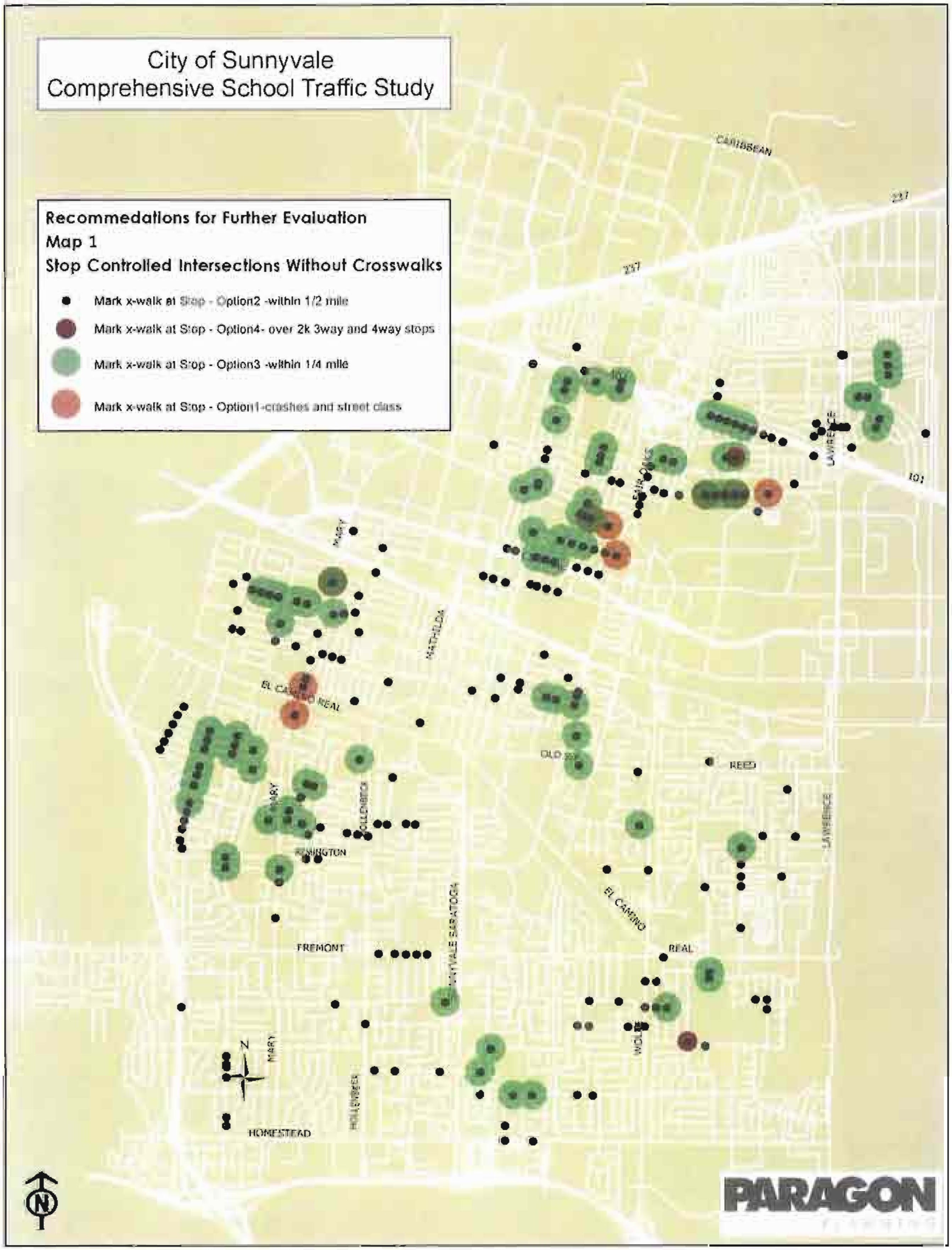
9. **Staff Recommendation**

Staff Recommendation Drop

If 'Support', 'Drop' or 'Defer', explain
Staff believes this issue is largely operational, and that a significant portion of the responsibility for school traffic should fall on school districts rather than the City. The City does, however, currently direct available resources to address school traffic issues as they arise. Also, the City, in partnership with the County Public Health Department, recently submitted a successful grant application for a comprehensive school traffic demand management program that will address many of the issues raised in the proposed study issue. This program will use a collaborative process to reach a minimum of 80% of Sunnyvale schools to design and implement transportation demand management programs and identify other measures that can be implemented within existing resource constraints. City staff from the Department of Public

Works and the Department of Public Safety are participating in the project, including site specific workshops with school staff and parents to design and implement transportation measures.

Reviewed by		Approved by	
Kent Steffens	10-3-11		10-4-11
Department Director	Date	City Manager	Date


City of Sunnyvale
Comprehensive School Traffic Study
Recommedations for Further Evaluation
Map 1
Stop Controlled Intersections Without Crosswalks
Mark x-walk at Stop - Option2 -within 1/2 mile
Mark x-walk at Stop - Option4- over 2k 3way and 4way stops
Mark x-walk at Stop - Option3 -within 1/4 mile
Mark x-walk at Stop - Option1-crashes and street class
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MATHILDA
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HOMESTEAD
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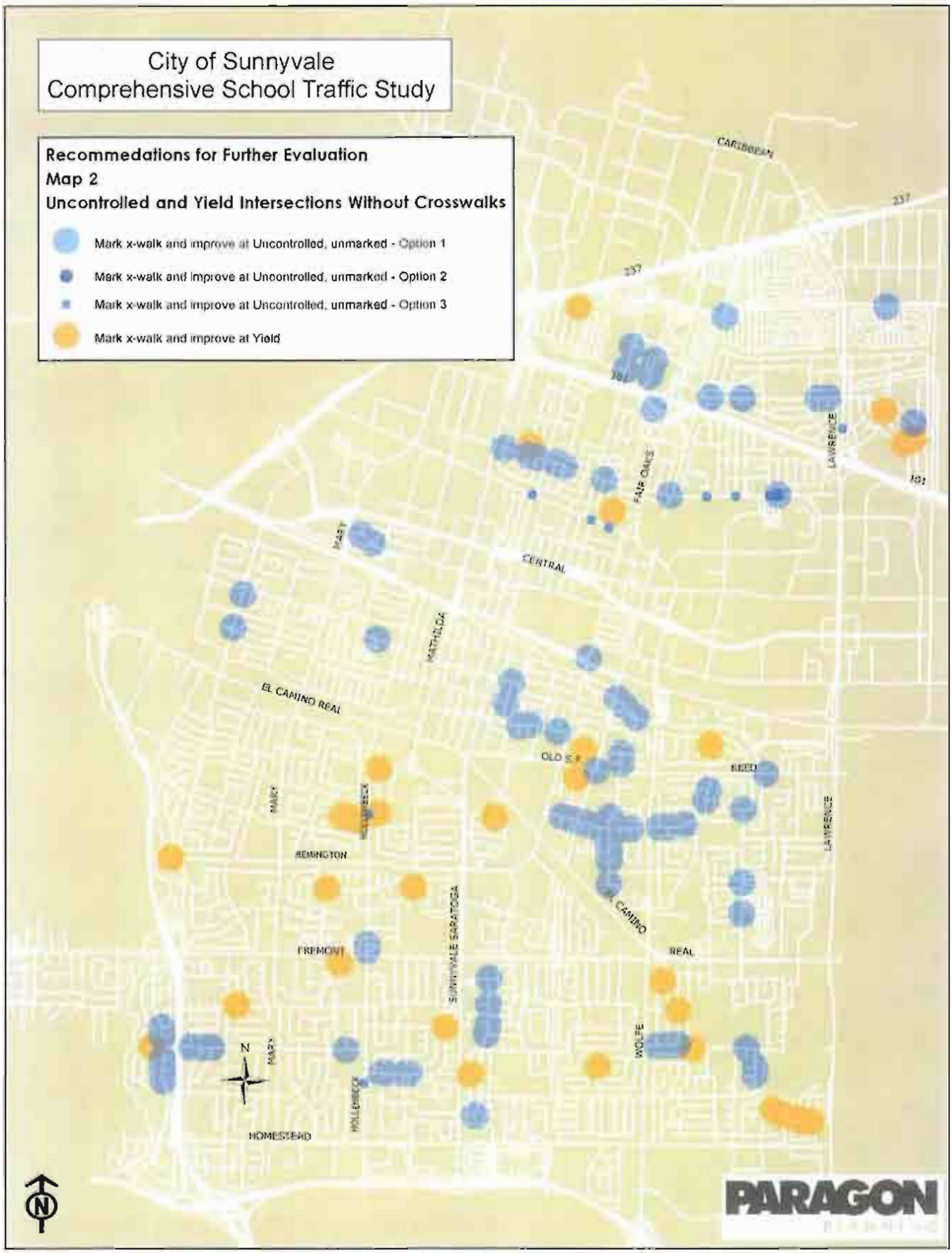
City of Sunnyvale
Comprehensive School Traffic Study
Recommedations for Further Evaluation
Map 2
Uncontrolled and Yield Intersections Without Crosswalks
Mark x-walk and improve at Uncontrolled, unmarked - Option 1
Mark x-walk and improve at Uncontrolled, unmarked - Option 2
Mark x-walk and improve at Uncontrolled, unmarked - Option 3
Mark x-walk and improve at Yield
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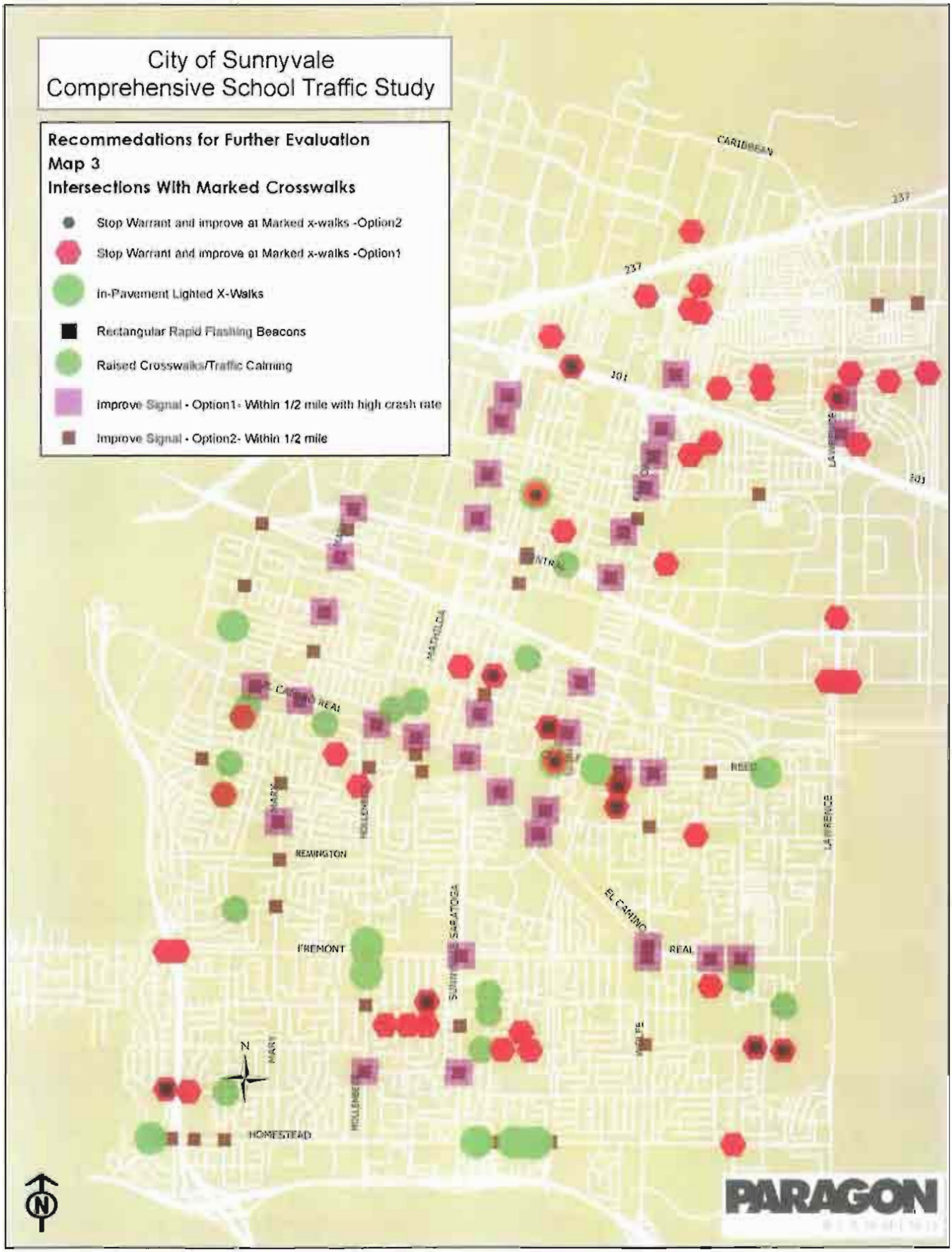
City of Sunnyvale
Comprehensive School Traffic Study
Recommedations for Further Evaluation
Map 3
Intersections With Marked Crosswalks
Stop Warrant and improve at Marked x-walks -Option2
Stop Warrant and improve at Marked x-walks -Option1
In-Pavement Lighted X-Walks
Rectangular Rapid Flashing Beacons
Raised Crosswalks/Traffic Calming
Improve Signal - Option1- Within 1/2 mile with high crash rate
Improve Signal - Option2- Within 1/2 mile
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City of Sunnyvale
Comprehensive School Traffic Study
Recommedations for Further Evaluation
School Zone Speed Limits - 15 MPH
Muni Code Section 10.28.010
School
School Zone Speed Limit Change - 15 MPH
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City of Sunnyvale

Comprehensive School Traffic Study

November 2012

PARAGON
PLANNING

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SECTION 1
INTRODUCTION

The goal of the Sunnyvale Comprehensive School Traffic Study is to proactively and uniformly identify intersections for improvement and/or further study along routes used by children to walk and bike to school.

The study aggregated existing transportation data for all intersections along school routes within the City of Sunnyvale. The data included intersection traffic control, traffic volume, collision information, speed limit, roadway classification, and existing signs and markings.

Intersection treatment options and criteria for implementation were then compiled to serve as a tool box for implementation of enhanced traffic control along routes used by children to walk to school. This was developed using the guidance and requirements from the Manual on Uniform Traffic Control Devices (MUTCD), current research from the National Center for Safe Routes to School, the 2007 Sunnyvale

Pedestrian Safety and Opportunities Study, examples from other municipalities, along with a number of other sources. This is detailed in Section 2 of the report.

The implementation criteria in conjunction with the transportation data were used to uniformly identify locations for further analysis. This is detailed in Section 3 of the report. The tables in Section 3 describe the existing traffic control and markings, the enhanced treatment options for consideration, and the criteria used to identify possible candidate intersections. In some cases multiple criteria were applied, varying from broad to restrictive. This is the case when "Options" are specified. The tables are also meant to accompany both the city wide and the school specific maps.

Future work will include a more detailed evaluation of each intersection and will identify locations where pedestrian counts, turning movement counts, speed surveys, and gap analysis should be collected.

SECTION 2
IMPROVEMENT OPTIONS AND CRITERIA

There are many different ways that an intersection can be modified to improve the safety, comfort, and convenience for children and families walking to school. This section describes a number of these intersection treatments that may be relevant for school routes in Sunnyvale. For each treatment there is a description, recommended implementation criteria for Sunnyvale, MUTCD Guidance, and a description of other precedence or details to consider.

Engineering criteria for devices on school routes allows for a lot of discretion. This toolbox of treatments and information associated with each treatment is aimed at standardizing Sunnyvale's application of improvements comprehensively, rather than on a reactionary basis. This section of the plan relates to the City of Sunnyvale General Plan Policy Policy LT –5.11 – The City should consider enhancing standards for pedestrian facilities.

Pavement Markings

Marked Crosswalks

Painted pedestrian crossings that specify proper locations for pedestrians to cross the street. Design may vary. Two parallel lines are standard. Ladder style is considered high–visibility.

Possible general criteria to consider in analysis:
–Speed limit under 40 mph
–Fewer than 4 lanes of traffic (unless there is a median island)
–Fewer than 12,000 ADT
–Over 20 student crossings in a peak hour.
–Consider crosswalks at intervals of 250 feet.

Recommended Implementation Criteria

Crosswalks should be marked at all intersections on established routes to a school where there is substantial conflict between motorists, bicyclists, and student movements; where students are encouraged to cross between intersections; where students would not otherwise recognize the proper place to cross; or where motorists or bicyclists might not expect students to cross.

Controlled Intersections (signal or stop): Use if a sidewalk exists on both sides of the street.

Uncontrolled Intersections: Must be convenient, accessible and in the direct pedestrian route to school.

Multi–lane or high volume marked crosswalks need substantial treatments so that crash risk does not increase.

Consider midblock crosswalks only if: there is adequate sight distance, protected intersection crossings are more than 200 feet away, the combination of traffic and pedestrian volume justify the installation, gap analysis shows that the frequency and adequacy of gaps in traffic is insufficient. Do not use in locations with speeds greater than 40 mph or Volumes greater than 20,000 vpd.

MUTCD Guidance

Section 3B –18 New marked crosswalks alone, without other measures designed to reduce traffic speeds, shorten crossing distances, enhance driver awareness of the crossing, and/or provide active warning of pedestrian presence, should not be installed across uncontrolled roadways where the speed limit exceeds 40 mph and either:
A. The roadway has four or more lanes of travel without a raised median or pedestrian refuge island and an ADT of 12,000 vehicles per day or greater; or
B. The roadway has four or more lanes of travel with a raised median or pedestrian refuge island and an ADT of 15,000 vehicles per day or greater.

Section 7A.03 Important to determine frequency and adequacy of gaps in the traffic stream. Use Traffic Control Devices Handbook Section 1A.11

Section 7C.02 Guidance: Crosswalks should be marked at all intersections on established routes to a school where there is substantial conflict between motorists, bicyclists, and student movements; where

Other Precedence/Details to Consider

Most installation guidance exempts school routes. ITE Recommended Practice on Design and Safety of Pedestrian Facilities Guidance for locations with

young pedestrians based on ped volume and ADT. Below are two examples from the table:
–Do not install with less than 15 peak hr ped crossings and under 7000 ADT
–2 lane street, with 25 peak hour peds requires 6,000 ADT to meet requirements.

FHWA Study (and Ped SOS):
–Below 12,000ADT there is no significant difference in safety between marked and unmaked for 2 lane roads.
–For multi lane roads and speeds over 40mph, don't install a crosswalk.
–Roads with speeds less than 35mph, and under 12,000 ADT could be a candidate for a marked crosswalk.

San Luis Obispo Installation Guidelines:
–40 or more peak hour peds, or 30 groupings of 2 or more during a 2 hr. period twice per day
– 85% speed below 40mph
– less than 3 travel lanes in each direction
– proper sight distance
– 2,700 ADT or more
– No controlled crosswalk within one block or 660ft

Sacramento Installation Guidelines:
–20 peds per peak hour or 60 per 4 hours
–located near a school with the nearest marked crosswalk at least 300 feet away.
– 250 feet of visibility
– If it meets the criteria, a different level of crosswalk is recommended per level.

Transportation Association of Canada:
– counts each youth, or disabled as 2 adults, and each senior as 1.5 when considering ped volume
they take crossing opportunity into account. ie. Analysis of vehicle gaps. And community size
There is a warrant chart based on number of peds and crossing opportunity.

Brookline Guidelines:
– Speed limit 40mph or less
– 20 or more pedestrians during peak hour of vehicle traffic. Less can be considered for child population
– ADT exceeds 3000
– A sidewalk or adequate shoulder exists on both sides of the roadway
– no other crosswalks within 200ft
– adequate sight distance

AASHTO Green Book.
No marked crosswalks on ADT greater than 9000 with 3 or more lanes of traffic.

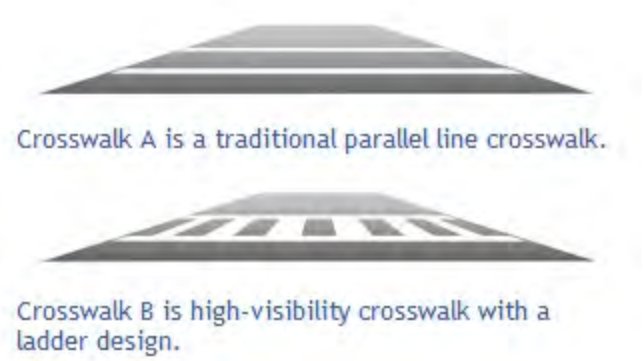


Image from National Center for Safe Routes to School. "Safe Routes to School Guide"

Advanced Stop/Yield Lines

Advance stop or yield lines are used to indicate the optimal stopping point for vehicles. They encourage drivers to stop/yield further back from the crosswalk.

Recommended Implementation Criteria

Use to promote better visibility between pedestrians and motorists, and help to prevent multiple–threat collisions particularly at mid–block or uncontrolled crossings. Consider advanced stop or yield signs at marked crosswalks with more than one lane of traffic in one direction. Install yield lines and signs at all marked crosswalks along a school route.

MUTCD Guidance

Yield here for pedestrians signs and markings may be used in advance of a marked crosswalk that crosses an uncontrolled multi lane approach. Should be placed 20 to 50 feet in advance of the nearest crosswalk line.

Section 3B.16 – If used, stop and yield lines should be placed a minimum of 4 feet in advance of the nearest crosswalk line at controlled intersections, and at midblock crosswalks.

Stop lines at midblock signalized locations should be placed at least 40 feet in advance of the nearest signal indication (see Section 4D.14).

If yield or stop lines are used at a crosswalk that crosses an uncontrolled multi–lane approach, the yield lines or stop lines should be placed 20 to 50 feet in advance of the nearest crosswalk line, and parking should be prohibited in the area between the yield or stop line and the crosswalk (see Figure 3B–17)

California MUTCD Section 7C.03 – The SCHOOL pavement marking may be used to guide, warn, or regulate traffic. CVC 21368. Should not be used at controlled intersections.

Other Precedence/ Details to Consider

Michael Cynecki Study:

–Typical stop lines are 4 feet in advance of the crosswalk, 20 feet for a mid–block location.

Angled or offset stop lines can be considered at signaized intersections with a multi–lane approach to help improve sight distance in the right lane relative to pedestrians.

– Not used at most crosswalks

– Wider crosswalk or wider crosswalk lines can also be effective.

– They may occasionally be used at stop controlled intersections with unmarked crosswalks.

Brookline DPW Guidelines:

Install a stop line at all crosswalks at signalized intersections a min of 4 feet from the crosswalk line.

Heatherstone and Dale, at the SR 85 Ped Bridge

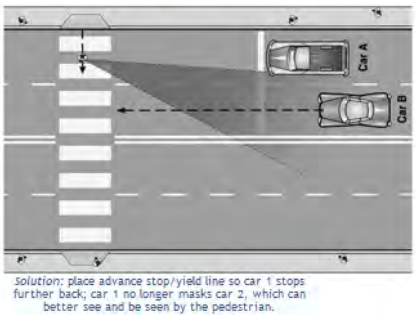


Image from National Center for Safe Routes to School. "Safe Routes to School Guide"

Raised Crosswalk

A speed table the width of a typical crosswalk stretching across an entire intersection, slowing traffic and keeping the crossing at grade with the sidewalk.

Recommended Implementation Criteria

Behaves more like a traffic calming device. Use traffic calming protocol for implementation.

Other Precedence/ data to consider

National Center for Safe Routes to School, Safe Routes to School Guide:

– Speed tables may increase the rate that vehicles yield to pedestrians

– Decreases vehicle speed.

Image from National Center for Safe Routes to School. "Safe Routes to School Guide"

Signs, Lights, and Beacons

Rectangular Rapid Flashing Beacons

Rectangular rapid flashing beacons (RRFBs) are active warning devices used to alert motorists of crossing pedestrians at uncontrolled crossings. They remain dark until activated by pedestrians, at which point they emit a bright, rapidly flashing yellow light, which signals drivers to stop. Studies suggest that RRFBs can significantly increase yielding rates over standard pedestrian warning signs

Recommended Implementation Criteria

– Consider RRFB for midblock crosswalks or uncontrolled marked crosswalks.
– Should be installed on both the right and left side of the crosswalk.
– Do not install within 300 feet of a controlled crossing
– Consider for high volume and speed roadways
– Consider for ADT greater than 2000 ADT and 85% speed of 40mph or greater.

MUTCD Guidance

They are not currently included in the MUTCD, but jurisdictions can use them if they obtain approval from FHWA.

Other Precedence/Details to Consider

National Center for Safe Routes to School, Safe Routes to School Guidelines recommends their us at midblock or marked uncontrolled crosswalks.

Image from Pedestrian and Bicycle Information Center
Image Library, Photographer Michael Frederick

Flashing Beacons and Overhead Signs

Overhead signs are easier for drivers to see in cases where on-street parking, street trees, or other visual obstructions. Flashing beacons at a marked crosswalk may draw additional attention to the crosswalk. In a busy urban environment, flashing beacons may not provide much benefit, while on a rural road, they may increase driver awareness of the crosswalk. Unlike the Rectangular Rapid Flashing Beacons, these are not pedestrian activated.

MUTCD Guidance

Section 4L.03 contains information regarding Warning Beacons to provide active warning of a pedestrian's presence.

Support:Typical applications of Warning Beacons include the following:

A. At obstructions in or immediately adjacent to the roadway;

B. As supplemental emphasis to warning signs;

C. As emphasis for midblock crosswalks;

Recommended Implementation Criteria

– Consider placement at mid-block crossings but can be used at intersections with uncontrolled crossings.

– Do not install within 300 feet of a controlled crossing

– Consider overhead sign for all uncontrolled marked crosswalks along the school route with ADT over 6000.

– Add flashing beacon if there are 70–100 vehicles/peak school hour and 20 pedestrians per peak school hour.

–Consider beacons for ADT greater than 2000 ADT and 85% speed of 40mph or greater.

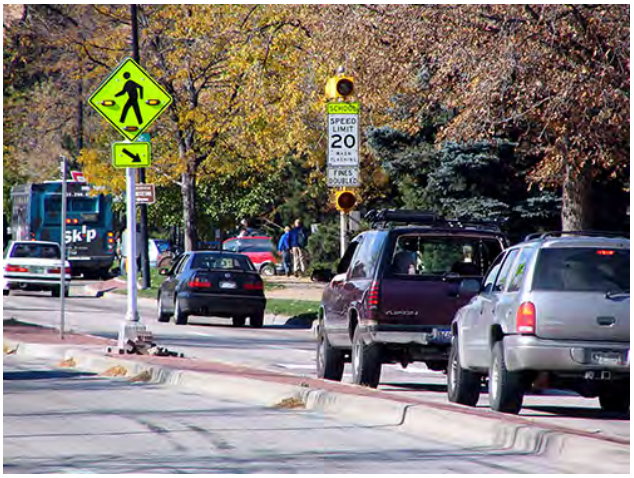
Other Precedence/Details to Consider

Los Angeles Guidelines**:**

– 300 feet of a controlled crossing

– Roadway to be crosssed is 50 feet or more.

– Point system based on peds more than 136 per peak hour (youth ect count as 2), vehicle volume greater than 2001 ADT, speed 85% of 40mph or faster, more than 7 lanes of traffic, and collision info.



Images from Pedestrian and Bicycle Information Center Image Library, Photographer Dan Burden

In–Pavement Lights

Lights embedded in the crosswalk pavement that are activated when a pedestrian pushes a button or starts walking across the crosswalk.

Recommended Implementation Criteria
– Consider at uncontrolled marked crosswalks.
– ADT greater than 10,000
– Ped volumes greater than 100 per hour.
– 85% speed less than 35 mph
– 2 or more lanes of traffic in one direction.

MUTCD Guidance
Section 4N.02 contains information regarding In–Road Warning lights at crosswalks. They must be located at a marked crosswalk at an uncontrolled intersection. In–roadway lights may be installed at certain marked crosswalks, based on an engineering study or engineering judgment, to provide additional warning to road users.

Other Precedence/Data to Consider
San Luis Obispo Guidelines**:**
100 or more peds per hour, or
100 groupings of 2 peds for a 2hours period twice per day.
Ped volume after dark is 75 or more for any one hour or 25 or more for a period of any four hours during the night time.
10,000 ADT or more
85% of 35mph or less
2 or more lanes in one direction but 4 lanes or less in both directions.
Uncontrolled crossing

National Center for Safe Routes to School, Safe Routes to School Guidelines recommends them for use at some uncrontrolled marked crosswalks with high collision rate, high volumes and high speeds.

In–Street Signs

These signs are usually installed at un–signalized pedestrian crossings to make the crosswalk more visible and increase driver yielding.

Recommended Implementation Criteria
Consider at uncontrolled marked crosswalks.
ADT greater than 10,000
Ped volumes greater than 100 per hour.
85% speed less than 35 mph
2 or more lanes of traffic in one direction.

MUTCD Guidance
Section 4N.02 contains information regarding In–Road Warning lights at crosswalks. They must be located at a marked crosswalk at an uncontrolled intersection. In–roadway lights may be installed at certain marked crosswalks, based on an engineering study or engineering judgment, to provide additional warning to road users.

Other Precedence/Data to Consider
San Luis Obispo Guidelines**:**
100 or more peds per hour, or
100 groupings of 2 peds for a 2hours period twice per day.
Ped volume after dark is 75 or more for any one hour or 25 or more for a period of any four hours during the night time.
10,000 ADT or more
85% of 35mph or less
2 or more lanes in one direction but 4 lanes or less in both directions.
Uncontrolled crossing

National Center for Safe Routes to School, Safe Routes to School Guidelines recommends them for use at some uncrontrolled marked crosswalks with high collision rate, high volumes and high speeds.

Visibility and Crossing Distance

Curb Extensions

The extension of the curb out from the sidewalk and into the street, typically at an intersection. Curb extensions increase pedestrian visibility and decrease pedestrian exposure distance in the street, crossing time and vehicle turn speeds. Curb extensions can also provide additional space for curb ramps.

Recommended Implementation Criteria

Consider installation at intersections with: Wide streets, where visibility is limited, or on street parking is heavily utilized

Other Precedence/Data to Consider

This a traffic calming device. Use traffic calming criteria.

Refuge Islands

Raised medians in the middle of a street at an intersection, midpoint of the block, or continuously along street.

Recommended Implementation Criteria

Protect crossing pedestrians from oncoming traffic by serving as a barrier from motor vehicles, reduce crossing distance and allow pedestrians to focus on one direction of traffic at a time.

Best if used in streets with 4 lanes of traffic or more,

Waiting areas/Stand Back Line

Extra paving at busy crossings where large numbers of pedestrians can congregate before crossing the street without having to stand close to the busy street, or on landscaping, dirt or mud.

Recommended Implementation Criteria

Consider implementation if there are high volumes of pedestrians, waiting to cross streets with speeds of 35mph or greater.

Reduce Corner Radius

The reduction of a corner radius to produce a tighter turn results in decreases in turning speeds and improved motor vehicle and pedestrian site distances, and a shortened pedestrian crossing distance.

Recommended Implementation Criteria

Similar to criteria for a bulb out, but can be considered on roadways without the presence of on street parking. Consider installation at intersections with**:** Wide streets**,** where visibility is limited.

Crossing Guards

Adult crossing guards assist elementary age children while crossing the street. They help provide a gap in traffic where engineering studies show that adequate gaps do not occur naturally.

Recommended Implementation Criteria

Consider an adult crossing guards if the following conditions exist:

Uncontrolled Intersections:

no alternate controlled crossing within 600 feet; and

In urban areas where the vehicular traffic volume exceeds 350 during each of any two hours (not necessarily consecutive) in which 40 or more school pedestrians cross daily while going to or from school;

or In rural areas where the vehicular traffic volume exceeds 300 during each of any two hours (not necessarily consecutive) in which 30 or more school pedestrians cross daily while going to or from school.

Whenever the critical (85th percentile) approach speed exceeds 40 mph, the guidelines for rural areas should be applied.

Stop controlled Intersections:

Where the vehicular traffic volumes on undivided highways of four or more lanes exceeds 500 per hour during any period when the school pedestrians are going to or from school.

Signal Controlled Intersections:

Where the number of vehicular turning movements through the school crosswalk exceeds 300 per hour while school pedestrians are going to or from school; or

Where justified through analysis of the operations of the intersection.

MUTCD Guidance

The State of California provides criteria for the placement of adult school crossing guards in the MUTCD 2012, California Supplement. Section 7D.02 Adult Crossing Guards

Intersection Control

Stop Sign and Signal Installation

The installation of a 2–way or 4–way stop sign at an intersection legally requires vehicles to stop before proceeding through an intersection. This provides an opportunity for pedestrians to cross. Traffic signals provide a protected phase where it is safe for pedestrians to cross.

Stop sign and signs installation must meet MUTCD/CA MUTCD warrants.

There are warrants for installing traffic control signals based on the volume of pedestrians. This is intended for situations where the vehicle volume is high creating excessive delay for pedestrians crossing.

Recommended Implementation Criteria

MUTCD

6000vpd/2500 vpd

3 collisions in 1 year

5 collisions in 2 years

must be classified residential collector

MUTCD Guidance

Other Precedence/Data to Consider

Brookline DPW Guidelines:

All signalized intersections shall have marked crosswalks on the roadway approaches that have sidewalks on both sides, or if adequate shoulder exists.

Crosswalk design should be two parallel lines 8–10 feet wide

Install a stop line all signalized intersections.

Pedestrian Actuated Signal / Pedestrian Hybrid Beacons

Traffic signals that are only activated when a pedestrian is present. They provide a controlled crossing for pedestrians without delaying motorists unnecessarily. They remain dark until activated by a pedestrian. Activation results in a sequence of amber and red beacon lights, which signal to drivers when to stop for crossing pedestrians and when to go again after pedestrians have cleared the crosswalk.

Recommended Implementation Criteria

No fewer than 20 pedestrian crossings per peak hour.

Inadequate gaps in vehicle traffic to allow for crossing.

Vehicle speed too high

excessive pedestrian delay

MUTCD Guidance

Chapter 4F contains information on Pedestrian Hybrid Beacons.

Support: A pedestrian hybrid beacon is a special type of hybrid beacon used to warn and control traffic at an unsignalized location to assist pedestrians in crossing a street or highway at a marked crosswalk.

Treatments for Signalized Intersections

The following should be considered at all signalized intersections along school routes: marked crosswalks on all legs, countdown pedestrian heads, ADA pedestrian push buttons, minimize pedestrian wait time, and increase pedestrian clearance intervals.

Recommended Implementation Criteria

Consider implementing these treatments at all signalized intersections along the school route.

MUTCD Guidance

4E.06 Pedestrian Intervals and Signal Phases requires this interval to be calculated based on a minimum walking speed of 3.5 feet per second. The additional time provided by an extended pushbutton press to satisfy pedestrian clearance time needs may be added to either the walk interval or the pedestrian change interval.

Guidance: Where pedestrians who walk slower than 3.5 feet per second, or pedestrians who use wheelchairs, routinely use the crosswalk, a walking speed of less than 3.5 feet per second should be considered in determining the pedestrian clearance time.

Other Precedence/Data to Consider

National Center for Safe Routes to School, Safe Routes to School Guidelines**:**

Some pedestrians, especially large groups of children, may need additional time to cross. Consideration should be given to increasing the pedestrian clearance interval if a pedestrian signal must accommodate pedestrians that need more time to cross. However, these considerations should be balanced against the potential for increased wait times between 'Walk' signals. The longer people must wait to cross the street, the more likely they will decide to cross against the signal. Pedestrian wait time can be reduced by shortening the overall signal cycle length or by providing an actuated demand–responsive pedestrian signal.

Right–turn–on–red restrictions/Leading pedestrian interval

Pedestrian and motor vehicle conflicts are a common occurrence when motorists get a green light and pedestrians get a green light or a "Walk" signal at the same time. While motorists are required to stop for pedestrians, conflicts are likely to occur. One solution is to install a "leading pedestrian interval" (LPI) which illuminates the pedestrian 'Walk' signal, while the motor vehicle signal remains red. The LPI gives pedestrians an opportunity to start walking and establish a presence in the crosswalk before motorists can begin their turn. The leading pedestrian interval is usually about three seconds or more. Prohibiting right–turn–on–red is also an option to reduce pedestrian/vehicle conflict.

Recommended Implementation Criteria

LPI should be considered for all signalized intersections along the school route.

MUTCD Guidance

MUTCD 4E.06 Pedestrian Intervals and Signal Phases

Sections 4E.09 through 4E.13

References

National Center for Safe Routes to School, Safe Routes to School Guide
http://guide.saferoutesinfo.org/engineering/index.cfm

2009 MUTCD
http://mutcd.fhwa.dot.gov/kno_2009r1r2.htm

2012 California MUTCD Edition
http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/ca_mutcd2012.htm

Crosswalks and Stop Lines
Michael J. Cynecki, PE

TCRP/NCHRP: Improving Pedestrian Safety at Unsignalized Crossings, Appendix F Pedestrian Crossing Installation Guidelines

Village of Brookline Department of Public Works, Crosswalk Policy and Design Guidelines

Sunnyvale Pedestrian Safety and Opportunities Study, 2007

Cover Image : BIcycle and Pedestrian Resource Center, Image Library, Photographer Dan Burden

SECTION 3
IMPROVEMENT IDENTIFICATION

There are sixteen schools with the City of Sunnyvale, most schools are within the Sunnyvale Unified School District, but some are within the Cupertino Unified School District or Santa Clara School District. Previous work by the Sunnyvale DPW, Division of Transportation and Traffic identified walking routes for all 16 schools.

For this study. all intersections on along these school routes were categorized by existing traffic control, signing and the presence of marked crosswalks. A data base and geographic information systems (GIS) map was then created for these intersections with information about speed limit, roadway classification, collision data, and traffic volume for each intersection.

The implementation criteria identified in Section 2 was applied to the intersection data collected in the GIS data base to identify specific locations where improvements should be considered.

Traffic control devices typically have very specific rules standards for implementation. However, treatments for intersections along school routes allows for a significant amount of flexibility and use of engineering judgment. For this reason, many of the recommendations include a number of options using criteria that range from broad to conservative. For example, one query might identify all stop controlled intersections within a ½ mile of a school – this would be a broad option. A conservative option would include only stop controlled intersections within ½ mile of the school on collector streets, with more than 3 collisions in 5 years.

The information in this section details the type of intersection, the improvement to consider, the specific sql query that was used (so that it can be recreated in the future), the name of the GIS file, and the GIS map symbol (so that it can be identified on the accompanying maps)

Signalized Intersections

Improvements to Consider	**Install High Visibility Crosswalks, Advanced Stop Bar, Leading Pedestrian Interval, Countdown Pedestrian signal, ADA Push Buttons, Minimize Ped Wait time, Increase Ped Clearance Intervals**
Criteria	**Option 1** **Signalized intersections within ½ mile of a school, on a school route, with 3 or more crashes in 1 year, or 5 or more crashes in 2 years.**
Query	"Control" = 'signalized' AND ("Crash1yr" = 3 OR "Crash2yr" = 5) AND "School" <> 'not school' AND "In_half_mi" = 'yes'
Result file name	signals_for_Improvement.shp 38 intersections
Map Label and Symbol	 Improve Signal - Option1- Within 1/2 mile with high crash rate

#	Signalized Intersections – Option 1	School
1	N MATHILDA AV & INDIO WY	Bishop
2	N MATHILDA AV & W MAUDE AV	Bishop
3	N MATHILDA AV & SAN ALESO AV	Bishop
4	ALMANOR AV & N MATHILDA AV & W AHWANEE AV	Bishop
5	OLD SAN FRANCISCO RD & GAIL AV	Braly
6	S MARY AV & W KNICKERBOCKER DR	Cumberland
7	HOLLENBECK AV & S PASTORIA AV & W EL CAMINO REAL	Cumberland
8	S MATHILDA AV & W EL CAMINO REAL	Ellis
9	S'VALE SARATOGA RD & S'VALE AV & E EL CAMINO REAL	Ellis
10	E OLIVE AV & S SUNNYVALE AV	Ellis
11	CEZANNE DR & E EL CAMINO REAL	Ellis
12	E REMINGTON DR & S FAIR OAKS AV & E EL CAMINO REAL	Ellis
13	S FAIR OAKS AV & IRIS AV	Ellis
14	OLD SAN FRANCISCO RD & S FAIR OAKS AV	Ellis
15	S FAIR OAKS AV & E OLIVE AV	Ellis
16	S FAIR OAKS AV & E EVELYN AV	Ellis
17	RAMP LAW SB N101 & LAWRENCE EX	Fairwood
18	SANDIA AV & LAKEHAVEN DR & LAWRENCE EX	Fairwood
19	RAMP N101 & N FAIR OAKS AV	Lakewood
20	REED AV & S WOLFE RD & OLD SAN FRANCISCO RD	Ponderosa
21	POPLAR AV & E EL CAMINO REAL	Ponderosa
22	HENDERSON AV & E EL CAMINO REAL	Ponderosa
23	E ARQUES AV & N FAIR OAKS AV	San Miguel
24	MAUDE AV & N FAIR OAKS AV	San Miguel
25	E DUANE AV & N FAIR OAKS AV	San Miguel
26	SAN CONRADO TE & N FAIR OAKS AV & CALIENTE DR	San Miguel
27	E AHWANEE AV & N FAIR OAKS AV	San Miguel
28	ALBERTA AV & HARWICK WY & SUNNYVALE SARATOGA RD	Stocklmeir
29	W FREMONT AV & SUNNYVALE SARATOGA RD	Stocklmeir
30	E FREMONT AV & S WOLFE RD	Stocklmeir
31	S WOLFE RDE EL CAMINO REAL	Stocklmeir
32	W EL CAMINO REAL & GRAPE AV	Vargas
33	W EL CAMINO REAL & S MARY AV	Vargas
34	S MARY AV & W WASHINGTON AV	Vargas
35	S MARY AV & W EVELYN AV	Vargas
36	N MARY AV & CX	Vargas
37	ALBERTA AV & HOLLENBECK AV	West Valley
38	W FREMONT AV & HOLLENBECK AV	West Valley

Improvements to Consider	**Install High Visibility Crosswalks, Advanced Stop Bar, Leading Pedestrian Interval, Countdown Pedestrian signal, ADA Push Buttons, Minimize Ped Wait time, Increase Ped Clearance Intervals**
Criteria	**Option 2** **Signalized intersections within ½ mile of a school, on a school route.**
Query	"Control" = 'signalized' AND "School" <> 'not school' AND "In_half_mi" = 'yes'
Result file name	signals_for_Improvement_option2.shp 78 intersections
Map Label and Symbol	Improve Signal - Option2- Within 1/2 mile

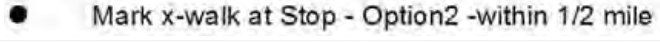
	Signalized Intersections – Option 2	School
1	N MATHILDA AV & INDIO WY	Bishop
2	N MATHILDA AV & W MAUDE AV	Bishop
3	N MATHILDA AV & SAN ALESO AV	Bishop
4	ALMANOR AV & N MATHILDA AV & W AHWANEE AV	Bishop
5	E CALIFORNIA AV & N SUNNYVALE AV & N SUNNYVALE AV*	Bishop
6	CX & N SUNNYVALE AV	Bishop
7	WCX & N SUNNYVALE AV	Bishop
8	E ARQUES AV & N SUNNYVALE AV	Bishop
9	N SUNNYVALE AV & E MAUDE AV	Bishop
10	OLD SAN FRANCISCO RD & GAIL AV	Braly
11	S BERNARDO AV & HEATHERSTONE WY	Cherry Chase
12	S MARY AV & TICONDEROGA DR	Cherry Chase
13	S MARY AV & W KNICKERBOCKER DR	Cumberland
14	S MARY AV & W REMINGTON DR	Cumberland
15	HEATHERSTONE AV & S MARY AV	Cumberland
16	DANFORTH DR & HOLLENBECK AV	Cumberland
17	HOLLENBECK AV & S PASTORIA AV & W EL CAMINO REAL	Cumberland
18	S MATHILDA AV & SENECA TE	Ellis
19	S MATHILDA AV & W EL CAMINO REAL	Ellis
20	TENNIS CENTER WY & S MATHILDA AV	Ellis
21	S'VALE SARATOGA RD & S'VALE AV & E EL CAMINO REAL	Ellis
22	E OLIVE AV & S SUNNYVALE AV	Ellis
23	S SUNNYVALE AV & E IOWA AV	Ellis
24	E MC KINLEY AV & S SUNNYVALE AV	Ellis
25	CEZANNE DR & E EL CAMINO REAL	Ellis
26	E REMINGTON DR & S FAIR OAKS AV & E EL CAMINO REAL	Ellis
27	S FAIR OAKS AV & IRIS AV	Ellis
28	OLD SAN FRANCISCO RD & S FAIR OAKS AV	Ellis
29	S FAIR OAKS AV & E OLIVE AV	Ellis
30	S FAIR OAKS AV & E EVELYN AV	Ellis
31	RAMP LAW SB N101 & LAWRENCE EX	Fairwood
32	SANDIA AV & LAKEHAVEN DR & LAWRENCE EX	Fairwood
33	TASMAN DR & BIRCHWOOD DR	Fairwood
34	BIRCHWOOD DR & LR	Fairwood
35	REAMWOOD AV & TASMAN DR	Fairwood
36	REAMWOOD AV & LR	Fairwood
37	RAMP N101 & N FAIR OAKS AV	Lakewood
38	S WOLFE RD & IRIS AV	Ponderosa

#	Signalized Intersections – Option 2	School
39	REED AV & S WOLFE RD & OLD SAN FRANCISCO RD	Ponderosa
40	POPLAR AV & E EL CAMINO REAL	Ponderosa
41	SEQUOIA DR & REED AV	Ponderosa
42	HENDERSON AV & E EL CAMINO REAL	Ponderosa
43	E EVELYN AV & REED AV	Ponderosa
44	E ARQUES AV & N FAIR OAKS AV	San Miguel
45	MAUDE AV & N FAIR OAKS AV	San Miguel
46	N WOLFE RD & N FAIR OAKS AV	San Miguel
47	E DUANE AV & N FAIR OAKS AV	San Miguel
48	SAN CONRADO TE & N FAIR OAKS AV & CALIENTE DR	San Miguel
49	E AHWANEE AV & N FAIR OAKS AV	San Miguel
50	E DUANE AV & DE GUIGNE DR	San Miguel
51	ALBERTA AV & HARWICK WY & SUNNYVALE SARATOGA RD	Stocklmeir
52	CHEYENNE DR & CONNEMARA WY & SUNNYVALE SARATOGA RD	Stocklmeir
53	W FREMONT AV & SUNNYVALE SARATOGA RD	Stocklmeir
54	E HOMESTEAD RD & BLUE JAY DR	Stocklmeir
55	BLUEJAY DR & HOMESTEAD RD	Stocklmeir
56	E HOMESTEAD RD & N BLANEY AV	Stocklmeir
57	N BLANEY AV & HOMESTEAD RD	Stocklmeir
58	MARION WY & S WOLFE RD	Stocklmeir
59	E FREMONT AV & S WOLFE RD	Stocklmeir
60	S WOLFE RDE EL CAMINO REAL	Stocklmeir
61	S BERNARDO AV & W WASHINGTON AV	Vargas
62	W EL CAMINO REAL & GRAPE AV	Vargas
63	S BERNARDO AV & W EVELYN AV & E EVELYN AVE	Vargas
64	W EL CAMINO REAL & S MARY AV	Vargas
65	S MARY AV & W IOWA AV	Vargas
66	S MARY AV & W WASHINGTON AV	Vargas
67	S MARY AV & W EVELYN AV	Vargas
68	W CALIFORNIA AV & N MARY AV & BUENA VISTA AV	Vargas
69	N MARY AV & CX	Vargas
70	BARRANCA DR & HOMESTEAD RD	West Valley
71	BELLEVILLE WY & W HOMESTEAD RD	West Valley
72	MAXINE AV & HOMESTEAD RD	West Valley
73	RAMP S85 HOMESTEAD & W HOMESTEAD RD	West Valley
74	S BERNARDO AV & RAMP HOMESTEAD N85 & W HOMESTEAD *	West Valley
75	WRIGHT AV & W HOMESTEAD RD	West Valley
76	ALBERTA AV & HOLLENBECK AV	West Valley
77	HOLLENBECK AV & CASCADE DR	West Valley
78	W FREMONT AV & HOLLENBECK AV	West Valley

Stop Controlled – Without Marked X-Walks

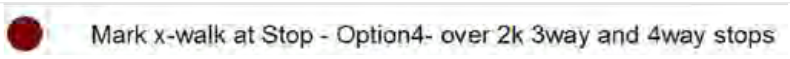
Improvements to Consider	**Install High Visibility Crosswalks**
Criteria	**Option 1** **Stop controlled intersections, along a school route, with no crosswalks, within ½ mile of a school, with 3 crashes in 1 year or 5 crashes in 2 years, on an arterial or collector**
Query	"Control" = 'stop' AND "School" <> 'not school' AND "In_half_mi" = 'yes' AND "Crosswalk" = ' ' AND ("Crash1yr" = 3 OR "Crash2yr" = 5) AND ("Collector" = 'yes' OR "Arterial" = 'yes')
Result file name	Install_Crosswalks_stopcontrol_Option1.shp 9 Intersections
Map Label and Symbol	

#	Stop Controlled with no X-Walks Option 1	School
1	ROOSEVELT AV & E MAUDE AV	Bishop
2	WORLEY AV & E MAUDE AV	Bishop
3	S MARY AV & BLAIR AV	Cumberland
4	E TAYLOR AV & N FAIR OAKS AV	San Miguel
5	E DUANE AV & SAN LUISITO WY	San Miguel
6	SANTA PAULA AV & E DUANE AV	San Miguel
7	E DUANE AV & SAN RAFAEL ST	San Miguel
8	W OLIVE AVS MARY AV	Vargas
9	CARSON DR & CARSON DR & S MARY AV	Vargas

Improvements to Consider	**Install High Visibility Crosswalks**
Criteria	**Option 2** **Stop controlled intersections, along a school route, with no crosswalks, within ½ mile of a school**
Query	"Control" = 'stop' AND "School" <> 'not school' AND "In_half_mi" = 'yes' AND "Crosswalk" = ' '
Result file name	stops_for_improvementbroad.shp 256 intersections
Map Label and Symbol	

Improvements to Consider	**Install High Visibility Crosswalks**
Criteria	**Option 3** **Stop controlled intersections, along a school route, with no crosswalks, within ¼ mile of a school**
Query	"Control" = 'stop' AND "School" <> 'not school' AND "quarter_mi" = 'Yes' AND "Crosswalk" = ' '
Result file name	Install_Crosswalks_stopcontrol_Option3.shp 88 intersections
Map Label and Symbol	 Mark x-walk at Stop - Option3 -within 1/4 mile

#	Stop Controlled with no X-Walks Option 3	School
1	STOWELL AV & W MAUDE AV	Bishop
2	E TAYLOR AV & N SUNNYVALE AV	Bishop
3	SCHROEDER ST & E ARQUES AV	Bishop
4	BORREGAS AV & E ARBOR AV	Bishop
5	W ARBOR AV & BORREGAS AV	Bishop
6	JACKSON ST & E ARQUES AV	Bishop
7	N BAYVIEW AV & E ARQUES AV	Bishop
8	BORREGAS AV & W FERNDALE AV	Bishop
9	N BAYVIEW AV & E TAYLOR AV	Bishop
10	BORREGAS AV & E HEMLOCK AV & W HEMLOCK AV	Bishop
11	BORREGAS AV & ALTURAS AV	Bishop
12	MORSE AV & E TAYLOR AV	Bishop
13	MORSE AV & E MAUDE AV	Bishop
14	ROOSEVELT AV & E TAYLOR AV	Bishop
15	MORSE AV & E MAUDE AV	Bishop
16	MORSE AV & E ARBOR AV	Bishop
17	ROOSEVELT AV & E MAUDE AV	Bishop
18	ALTURAS AV & E AHWANEE AV	Bishop
19	MORSE AV & WADDINGTON AV	Bishop
20	S FERNWOOD CL & MORSE AV	Bishop
21	N FERNWOOD CL & MORSE AV	Bishop
22	MORSE AV & E AHWANEE AV	Bishop
23	LUSTERLEAF DR & IRIS AV	Braly
24	S BERNARDO AV & LAFAYETTE & DR	Cherry Chase
25	S BERNARDO AV & JAMESTOWN DR	Cherry Chase
26	S BERNARDO AV & W CARDINAL DR	Cherry Chase
27	S BERNARDO AV & MORNINGSIDE DR	Cherry Chase
28	S BERNARDO AV & SUSAN WY & SUSAN WY	Cherry Chase
29	S BERNARDO AV & LYNN WY	Cherry Chase
30	S BERNARDO AV & PARKINGTON AV	Cherry Chase
31	ROCKEFELLER DR & LIME DR	Cherry Chase
32	W REMINGTON DR & LIME DR	Cherry Chase
33	SUSAN WY & GRAPE AV	Cherry Chase
34	LYNN WY & GRAPE AV	Cherry Chase
35	PARKINGTON AV & GRAPE AV	Cherry Chase
36	HEATHERSTONE AV & LOIS AV	Cherry Chase
37	LOIS AV & LYNN WY	Cherry Chase
38	MARANTA AV & W KNICKERBOCKER DR	Cherry Chase
39	S MARY AV & ROCKEFELLER DR	Cherry Chase
40	W KNICKERBOCKER DR & ITHACA AV	Cumberland
41	NORFOLK PINE AV & ITHACA AV	Cumberland
42	PEPPER AV & W KNICKERBOCKER DR	Cumberland
43	PEACH AV & HANOVER AV & HEATHERSTONE AV	Cumberland
44	HANOVER AV & PIPPIN AV	Cumberland
45	CUMBERLAND DR & QUETTA AV	Cumberland
46	E MC KINLEY AV & CENTRAL AV	Ellis
47	E MC KINLEY AV & KENMORE AV	Ellis
48	E MC KINLEY AV & S FAIR OAKS AV	Ellis
49	FIRLOCH AV & E OLIVE AVE OLIVE AV	Ellis
50	OLD SAN FRANCISCO RD & GRAND FIR AV	Ellis
51	BURNTWOOD AV & SANDIA AV & BURNTWOOD CT	Fairwood
52	SANDIA AV & CANDLEWOOD CT & CANDLEWOOD AV	Fairwood
53	FAIRWOOD AV & TUCSON AV	Fairwood
54	FAIRWOOD AV & CANDLEWOOD AV & TORRANCE AV	Fairwood
55	PALAMOS AV & FAIRWOOD AV	Fairwood
56	PECOS WY & FAIRWOOD AV	Fairwood
57	FAIRWOOD AV & PRESCOTT AV	Fairwood
58	MORSE AV & E WEDDELL DR	Lakewood
59	S CASCADE TE & YUKON DR & CASCADE DR	Nimitz
60	ELIZABETH WY & RAMON DR	Peterson
61	BRYANT WY & POPLAR AV	Peterson
62	BRYANT WY & POPLAR AV	Peterson
63	HENDERSON AV & LUPINE DR	Ponderosa
64	BERNAL AV & CALIENTE DR	San Miguel
65	CALIENTE & JOHANNA AV & DR	San Miguel
66	E DUANE AV & SAN LUISITO WY	San Miguel
67	SAN JUNIPERO DR & E AHWANEE AV	San Miguel
68	SAN MIGUEL AV & E DUANE AV	San Miguel
69	SAN MATEO CT & E AHWANEE AV	San Miguel
70	E DUANE AV & SAN PATRICIO AV	San Miguel
71	SAN PABLO AV & AMADOR AV	San Miguel
72	SAN PABLO AV & E AHWANEE AV	San Miguel
73	SANTA PAULA AV & E DUANE AV	San Miguel
74	SANTA PAULA AV & AMADOR AV	San Miguel
75	SANTA PAULA AV & E AHWANEE AV	San Miguel
76	SAN RAMON AV & E AHWANEE AV	San Miguel
77	BITTERN DR & HARWICK WY	Stocklmeir
78	DUNHOLME WY & BLACKHAWK DR & BLACKHAWK CT	Stocklmeir
79	INVERNESS WY & CROW CT	Stocklmeir
80	MARIANI DR & INVERNESS WY	Stocklmeir
81	CORRAL AV & W WASHINGTON AV	Vargas
82	W WASHINGTON AV & GABILAN AV	Vargas
83	W WASHINGTON AV & LANITOS AV	Vargas
84	W MC KINLEY AV & LEOTA AV	Vargas
85	W WASHINGTON AV & LIEBRE CT	Vargas
86	LOMETA AV & W WASHINGTON AV	Vargas
87	CARSON DR û CARSON DR & S MARY AV	Vargas
88	W WASHINGTON AV & MATADERO DR	Vargas

Improvements to Consider	**Install High Visibility Crosswalks**
Criteria	**Option 4** **Stop controlled intersections, along a school route, with no crosswalks, within1/2 mile of the a school, with traffic volume greater than 2,000AWDT or on a collector street, 3-way or 4-way stop only**
Query	"Control" = 'stop' AND "School" <> 'not school' AND "Crosswalk" = ' ' AND "In_half_mi" = 'yes' AND("ADT_EW" > 2000 OR "ADT_NS" > 2000 OR "Collector" = 'yes') AND("Stop_Type" = '3-way' OR "Stop_Type" = '4-way')
Result file name	Install_Crosswalks_stopcontrol_Option4.shp 2 intersections
Map Label and Symbol	

#	Stop Controlled with no X-Walks Option 4	School
1	MARION WY & DUNFORD AV & NORMAN DR	Peterson
2	SANTA PAULA AV & AMADOR AV	San Miguel

Yield Controlled – Without Marked X-Walks

Improvements to Consider	**Install High Visibility Crosswalks, Advanced Yield Lines, Consider in-street signs**
Criteria	Yield controlled intersections, along a school route, with no crosswalks
Query	"Control" = 'yield' AND "Crosswalk" = ' ' AND "School" <> 'not school'
Result file name	yield_for_improvement.shp 32 intersections
Map Label and Symbol	 High Visiblity Crosswalks at Yield intersections

#	Yield Controlled with no X-Walks	School
1	MADRONE AV & W EAGLEWOOD AV	Bishop
2	E ARBOR AV & WORLEY AV	Bishop
3	W REMINGTON DR & ROBIN WY	Cherry Chase
4	POME AV & SHERATON DR	Cherry Chase
5	HOLBROOK PL & HAVERHILL DR	Cumberland
6	PYRUS WY & HAVERHILL DR	Cumberland
7	HAVERHILL DR & QUETTA CT & QUETTA AV	Cumberland
8	RUBIS DR & HARVARD AV	Cumberland
9	RESEDA DR & DANFORTH DR	Cumberland
10	SPINOSA DR & TEMPLETON CT & TEMPLETON DR	Cumberland
11	CEZANNE DR & BRAHMS WY	Ellis
12	BELLFLOWER AV & GRAND FIR AV	Ellis
13	GRAND FIR AV & BEGONIA WY	Ellis
14	ASTER CT & SEQUOIA DR & ASTER AV	Ellis
15	SOCORRO AV & FAIRWOOD AV	Fairwood
16	HAVENWOOD AV & TORRANCE AV & TUCSON AV	Fairwood
17	SOCORRO AV & HAVENWOOD AV	Fairwood
18	PLAZA DR & FULTON AV	Lakewood
19	YUKON DR & CHEYENNE DR	Nimitz
20	ELEANOR WY & RAMON DR	Peterson
21	ELIZABETH WY & NAVARRO DR	Peterson
22	ORIOLE AV & DUNFORD AV	Peterson
23	LOCHINVAR AV & SWIFT CT	Peterson
24	BENTON ST & LOCHINVAR AV & BENTON CT	Peterson
25	VIREO AV & LOCHINVAR AV	Peterson
26	WARBLER AV & LOCHINVAR AV & WARBLER WY	Peterson
27	LOCHINVAR AV & WAXWING AV	Peterson
28	HARWICK WY & ALBATROSS DR	Stocklmeir
29	HERON AV & FIFE WY	Stocklmeir
30	BEDFORD AV & THE DALLES	West Valley
31	FRANCHERE PL & CASCADE DR	West Valley
32	ALLISON WY & NELSON WY	West Valley

Uncontrolled – With Marked X-Walks

Improvements to Consider	**Conduct Stop Warrant Studies** **Install advanced Yield Lines and Yield Signs, and In-Street Signs**
Criteria	**Option 1** **Uncontrolled marked crosswalks, on a school route**
Query	"Control" = ' ' AND ("Crosswalk" = ' Yes' OR "Crosswalk" = 'yes') AND "School" <> 'not school'
Result file name	Stop_WarrantOption1.shp 51 intersections
Map Label and Symbol	

#	Uncontrolled with X-Walks Option 1	School
1	BORREGAS AV & W MAUDE AV	Bishop
2	N BAYVIEW AV & HAZELTON AV	Bishop
3	GAIL AV & GLADIOLA DR	Braly
4	GAIL AV & CALLA DR	Braly
5	JAMESTOWN DR & GRAPE AV	Cherry Chase
6	ANDOVER DR & GRAPE AV	Cherry Chase
7	CUMBERLAND DR & PIPER AV	Cumberland
8	ELMIRA DR & QUETTA AV	Cumberland
9	W MC KINLEY AV & S TAAFFE ST	Ellis
10	E MC KINLEY AV & SATURN TE	Ellis
11	E OLIVE AV & KENMORE AV	Ellis
12	OLD SAN FRANCISCO RD & BLACKWOOD TE	Ellis
13	KIFER RD & SAN ZENO WY	Ellis
14	KIFER RD & LAWRENCE STATION RD	Ellis
15	KIFER RD & GORDON AV	Ellis
16	BLAZINGWOOD DR & PECOS WY	Fairwood
17	BLAZINGWOOD DR & FAIRWOOD AV	Fairwood
18	FAIRWOOD AV & HH	Fairwood
19	HH & MANZANO WY	Fairwood
20	PED XING OVER CALABAZAS & MANZANO WY	Fairwood
21	DUNCAN AV & GARNER DR	Lakewood
22	BORREGAS AV & W WEDDELL DR	Lakewood
23	MORSE AV & PLENTY TE	Lakewood
24	MONTEGO TE & LE MANS TE	Lakewood
25	E JAVA DR & CROSSMAN AV	Lakewood
26	FAIR OAKS WY & N FAIR OAKS AV	Lakewood
27	ELDORADO MHP	Lakewood
28	HIDDENLAKE DR & HH	Lakewood
29	MEADOWLAKE DR & LAKEFAIR DR	Lakewood
30	HH & MEADOWLAKE DR	Lakewood
31	LAKEHAVEN DR & VELVET LAKE DR	Lakewood
32	OWEN SOUND DR & CHEYENNE DR	Nimitz
33	CHEYENNE DR & REVELSTOKE WY	Nimitz
34	CHEYENNE DR & SASKATCHEWAN DR	Nimitz
35	CASCADE DR & SELO DR	Nimitz
36	POPLAR AV & ROSALIA AV	Peterson
37	N TANTAU AV & HOMESTEAD RD	Peterson
38	DUNFORD WY & LOCHINVAR AV	Peterson
39	DUNFORD WY & THUNDERBIRD AV	Peterson
40	PONDEROSA AV & LANTANA DR	Ponderosa
41	N WOLFE RD & STEWART DR	San Miguel
42	SAN JUAN DR & BLYTHE AV	San Miguel
43	SAN JUNIPERO DR & ALVARADO AV	San Miguel
44	MIRALOMA WY & LAWRENCE EX	San Miguel
45	CHICKADEE CT & DUNHOLME WY	Stocklmeir
46	DUBLIN WY & FLOYD AV	Stocklmeir
47	CONDOR WY & DUNHOLME WY	Stocklmeir
48	RAMP FREMONT S85 & W FREMONT AV	West Valley
49	BELLEVILLE WY	West Valley
50	RAMP N85 & FREMONT AV	West Valley
51	CORONACH AV & HELENA DR	West Valley

Criteria	**Option 2** **Uncontrolled marked crosswalks, within ½ mile of the school, classified as a collector street, or with over 2000 AWDT volumes**
Query	"Control" = ' ' AND "Crosswalk" = 'yes' AND "In_half_mi" = 'yes' AND("ADT_EW" > 2000 OR "ADT_NS" > 2000 OR "Collector" = 'yes' OR "Arterial" = 'yes')
Result file name	Stop_WarrantOption2.shp 12 intersections
Map Label and Symbol	

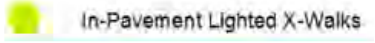
#	Uncontrolled with X-Walks Option 2	School
1	BORREGAS AV & W MAUDE AV	Bishop
2	GAIL AV & GLADIOLA DR	Braly
3	GAIL AV & CALLA DR	Braly
4	E MC KINLEY AV & SATURN TE	Ellis
5	E OLIVE AV & KENMORE AV	Ellis
6	OLD SAN FRANCISCO RD & BLACKWOOD TE	Ellis
7	BORREGAS AV & W WEDDELL DR	Lakewood
8	LAKEHAVEN DR & VELVET LAKE DR	Lakewood
9	CASCADE DR & SELO DR	Nimitz
10	DUNFORD WY & LOCHINVAR AV	Peterson
11	DUNFORD WY & THUNDERBIRD AV	Peterson
12	BELLEVILLE WY	West Valley

Improvements to Consider	**Raised Crosswalk or other Traffic Calming**
Criteria	All marked crosswalks, within ½ mile of a school, on a residential street, with volume higher than 1000 AWDT, without a traffic signal.
Query	"Crosswalk" = 'yes' AND "School" <> 'not school' AND "In_half_mi" = 'yes' AND "Collector" = ' ' AND "Arterial" = ' ' AND "Control" <> 'signalized' AND "Expressway" = ' ' AND("ADT_EW" > 1000 OR "ADT_NS" > 1000)
Result file name	raised_crosswalks_potential.shp 16 intersections
Map Label and Symbol	

#	Uncontrolled with X-Walks – Raised X-walk/Traffic Calming	School
1	MORSE AV & E ARQUES AV	Bishop
2	JAMESTOWN DR & GRAPE AV	Cherry Chase
3	HEATHERSTONE AV & HEATHERSTONE WY & GRAPE AV	Cherry Chase
4	TICONDEROGA DR & LIME DR	Cherry Chase
5	ANDOVER DR & GRAPE AV	Cherry Chase
6	BLAIR AV & GRAPE AV	Cherry Chase
7	PEACH AV & BLAIR AV	Cumberland
8	ALL AMERICA WY & W OLIVE AV	Cumberland
9	CHARLES ST & W OLIVE AV	Cumberland
10	E WASHINGTON AV & S BAYVIEW AV	Ellis
11	HENDERSON AV & BRYANT WY	Peterson
12	THUNDERBIRD AV & LILLICK DR	Peterson
13	BITTERN DR & DUNHOLME WY	Stocklmeir
14	BITTERN DR & CONNEMARA WY	Stocklmeir
15	BITTERN DR & CARLISLE WY	Stocklmeir
16	WRIGHT AV & HELENA DR	West Valley

Improvements to Consider	**Rectangular Rapid Flashing Beacons**
Criteria	All uncontrolled intersections, within ½ of a school, with marked crosswalks, on a school route, on a collector street, [criteria says 85th % speed over 35mph and over 2000 ADT and 300 ft. distance from controlled crossing but data no or available in GIS. Distance from a controlled intersection was manually removed]
Query	"Control" = ' ' AND "In_half_mi" = 'yes' AND "School" <> 'not school' AND "Collector" = 'yes' AND "Crosswalk" = 'yes'
Result file name	RRFB.shp 8 intersections
Map Label and Symbol	

#	Uncontrolled with X-Walks – RRFB	School
1	GAIL AV & GLADIOLA DR	Braly
2	GAIL AV & CALLA DR	Braly
3	E OLIVE AV & KENMORE AV	Ellis
4	BORREGAS AV & W WEDDELL DR	Lakewood
5	CASCADE DR & SELO DR	Nimitz
6	DUNFORD WY & LOCHINVAR AV	Peterson
7	DUNFORD WY & THUNDERBIRD AV	Peterson
8	BELLEVILLE WY	West Valley

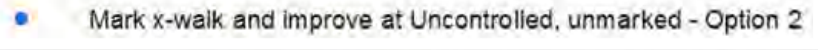
Improvements to Consider	**In-Pavement Lighted Crosswalks**
Criteria	All uncontrolled intersections, with speed limit under 40mph, AWDT is over 10,000, on a school route, with in ½ mile of the a school, not on an arterial street.
Query	"Control" = ' ' AND "In_half_mi" = 'yes' AND "School" <> 'not school' AND "SPEED" <40 AND("ADT_EW" > 10000 OR "ADT_NS" > 10000) AND "Arterial" <> 'yes'
Result file name	Inpavement_Lighted_Crosswalks_potential.shp 14 Intersections
Map Label and Symbol	

#	Uncontrolled with X-Walks – In-Pavement Lighted Xwalks	School
1	BORREGAS AV & W MAUDE AV	Bishop
2	WINDSOR TE & HOLLENBECK AV	Cumberland
3	HOLLENBECK AV & YELLOWSTONE TE	Cumberland
4	OLD SAN FRANCISCO RD & BLACKWOOD TE	Ellis
5	OLD SAN FRANCISCO RD & IRONWOOD TE	Ellis
6	REED AV & BOUGAINVILLEA TE	Ponderosa
7	E HOMESTEAD RD & CUPERTINO SV BORDER	Stocklmeir
8	NORTHSKY SQ & HOMESTEAD RD	Stocklmeir
9	NORTHPOINT WY & HOMESTEAD RD	Stocklmeir
10	NORTHWIND SQ & HOMESTEAD RD	Stocklmeir
11	S BERNARDO AV & EATON TE	Vargas
12	W HOMESTEAD RD & STEVENS CREEK	West Valley
13	BEND DR & HOLLENBECK AV	West Valley

Uncontrolled – Without Marked X-Walks

Improvements to Consider	**Install High Visibility Crosswalks, Advanced Yield Lines and In Street Signs, Conduct Stop Warrant Analysis**
Criteria	**Option 1** **All uncontrolled intersections, with no crosswalks, with speed limit under 40mph, AWDT is over 2,000, under 12,0000, on a school route, with in ½ mile of a school.**
Query	"Control" = ' ' AND "Crosswalk" = ' ' AND "SPEED" < 40 AND "School" <> 'not school' AND "In_half_mi" = 'yes' AND (("ADT_EW" >2000 AND "ADT_EW" < 12000) OR ("ADT_NS" > 2000 AND "ADT_NS" < 12000))
Result file name	Uncontrolled_Unmarked_crosswalks.shp 85 intersections
Map Label and Symbol	

N	Uncontrolled no X-Walks Option 1	School
1	PINE AV & W DUANE AV	Bishop
2	MADRONE AV & W DUANE AV	Bishop
3	MANZANITA AV & W DUANE AV	Bishop
4	WAITE & E DUANE AV & AV	Bishop
5	KIRK AV & E DUANE AV	Bishop
6	E DUANE AV & MAPLE AV	Bishop
7	FAIR OAKS MOBILE LODGE & E AHWANEE AV	Bishop
8	PIERINO AV & IRIS AV	Braly
9	IRIS AV & HENRIETTA AV	Braly
10	GAIL AV & LINDEN AV	Braly
11	ANSHEN CT & GAIL AV	Braly
12	GAVELLO AV & GAIL AV	Braly
13	GAIL AV & DUFF CT	Braly
14	GAIL AV & GOLDENROD CT	Braly
15	KATON CT & IRIS AV	Braly
16	GAIL AV & CALICO CT	Braly
17	BLUE SAGE DR & GAIL AV	Braly
18	KOA CT & IRIS AV	Braly
19	WINDSOR TE & HOLLENBECK AV	Cumberland
20	HOLLENBECK AV & YELLOWSTONE TE	Cumberland
21	PESCADERO TE & W MC KINLEY AV	Cumberland
22	E IOWA AV & FLORA VISTA AV	Ellis
23	E MC KINLEY AV & FLORA VISTA AV	Ellis
24	MAXINE AV & E OLIVE AV & MAXINE AVE OLIVE AV	Ellis
25	E OLIVE AV & CARLYN CT	Ellis
26	E OLIVE AV & WILSON AV	Ellis
27	FOXTAIL DR & IRIS AV	Ellis
28	GOLDEN OAK DR & IRIS AV	Ellis
29	JACKPINE CT & IRIS AV	Ellis
30	E HENDY AV & N FAIR OAKS AV	Ellis
31	OLD SAN FRANCISCO RD & IRONWOOD TE	Ellis
32	E EVELYN AV & HOLLY TE	Ellis
33	E EVELYN AV & HOLLY TE	Ellis
34	E EVELYN AV & BRISTOL COMMONS APTS	Ellis
35	ADOBE WELLS MHP & TASMAN DR	Fairwood
36	OAK CREEK WY & SANDIA AV	Fairwood
37	HH & MORSE AV	Lakewood
38	TIMOR TE & MORSE AV	Lakewood
39	E WEDDELL DR	Lakewood
40	JENA TE & E WEDDELL DR	Lakewood
41	JENA TE & E WEDDELL DR	Lakewood
42	LAKEHAVEN TE & LAKEHAVEN DR	Lakewood
43	TASMAN DR & TASMAN CT	Lakewood
44	LAKEHAVEN DR & JADELAKE CT	Lakewood
45	LAKEMUIR DR & LAKEHAVEN DR	Lakewood
46	LAKEHAVEN DR & TWINLAKE DR	Lakewood
47	ALBERTA AV & OAK POINT TE	Nimitz
48	PINE PASS TE & ALBERTA AV	Nimitz
49	ALBERTA AV & RESTON TE	Nimitz
50	ALBERTA AV & RIORDEN TE	Nimitz
51	MARION WY & HAMPTON DR	Peterson
52	RAMON DR & MARION WY	Peterson
53	NAVARRO DR & MARION WY	Peterson
54	DUNFORD WY & SANDPIPER CT	Peterson
55	LOCHINVAR AV & DURHAM CT	Peterson
56	FIRTH CT & LOCHINVAR AV	Peterson
57	MAHOGANY LN & IRIS AV	Ponderosa
58	MESQUITE & PL & IRIS AV	Ponderosa
59	IRIS AV & LADIS CT	Ponderosa
60	SHASTA FIR WY & SEQUOIA DR	Ponderosa
61	ERICA DR & SEQUOIA DR	Ponderosa
62	HENDERSON AV & THUNDERBIRD MHP	Ponderosa
63	HENDERSON AV	Ponderosa
64	HENDERSON AV & GARDENIA WY	Ponderosa
65	REED AV & BOUGAINVILLEA TE	Ponderosa
66	E DUANE AV & N BRITTON AV	San Miguel
67	SANTA ROSALIA TE & E DUANE AV	San Miguel
68	KIRBYHILL WY & BITTERN DR	Stocklmeir
69	DUBLIN WY & BITTERN DR	Stocklmeir
70	CROMART CT & BITTERN DR	Stocklmeir
71	BITTERN DR & CARLOW CT	Stocklmeir
72	BITTERN DR & BERWICK WY	Stocklmeir
73	S BERNARDO AV & EATON TE	Vargas
74	S BERNARDO AV & DURAN TE	Vargas
75	W CALIFORNIA AV & LA MESA TE	Vargas
76	BELMONT TE & LA MESA TE & W CALIFORNIA AV	Vargas
77	BELLEVILLE WY & BELLINGHAM WY	West Valley
78	BELLEVILLE WY & BELLEVILLE CT	West Valley
79	BELLEVILLE WY & BELLEVILLE PL	West Valley
80	BELLEVILLE LN & BELLEVILLE WY	West Valley
81	BELLEVILLE WY	West Valley
82	ENDERBY WY & THE DALLES	West Valley
83	CORONACH AV & THE DALLES	West Valley
84	DOMINION AV & THE DALLES	West Valley
85	THE DALLES & NEWFOUNDLAND DR	West Valley

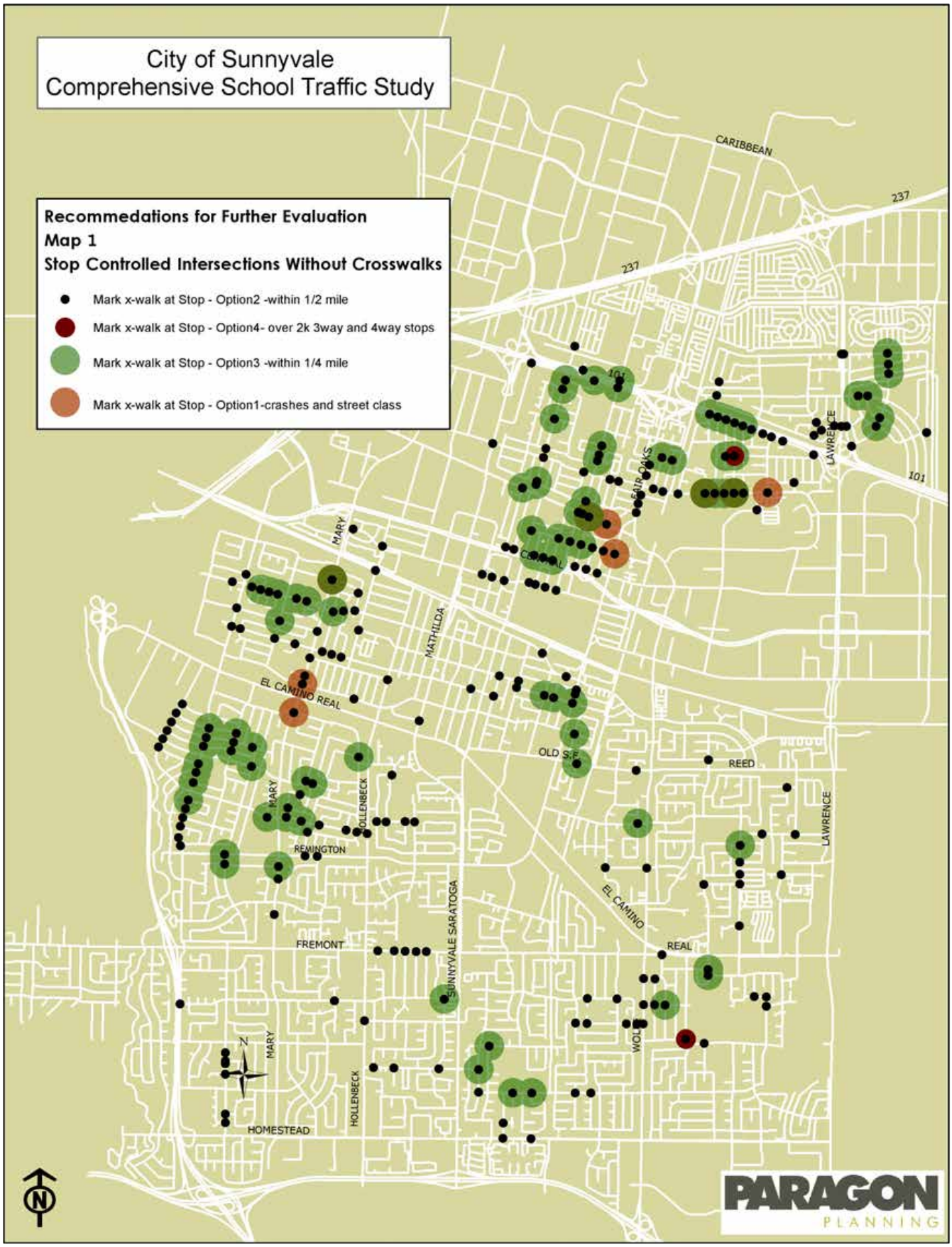
Improvements to Consider	**Install High Visibility Crosswalks, Advanced Yield Lines and In Street Signs, Conduct Stop Warrant Analysis**
Criteria	**Option 2** **All uncontrolled intersections, with no crosswalks, with speed limit under 40mph, AWDT is over 2,000, under 12,0000, on a school route, with in ½ mile of a school, with 3 collisions in 1 year or 5 collisions in 2 years.**
Query	"Control" = ' ' AND "Crosswalk" = ' ' AND "SPEED" < 40 AND "School" <> 'not school' AND("Crash1yr" = 3 OR "Crash2yr" = 5)AND "In_half_mi" = 'yes' AND (("ADT_EW" >2000 AND "ADT_EW" < 12000) OR ("ADT_NS" > 2000 AND "ADT_NS" < 12000))
Result file name	Uncontrolled_Unmarked_crosswalks_Option2.shp 1 intersection
Map Label and Symbol	

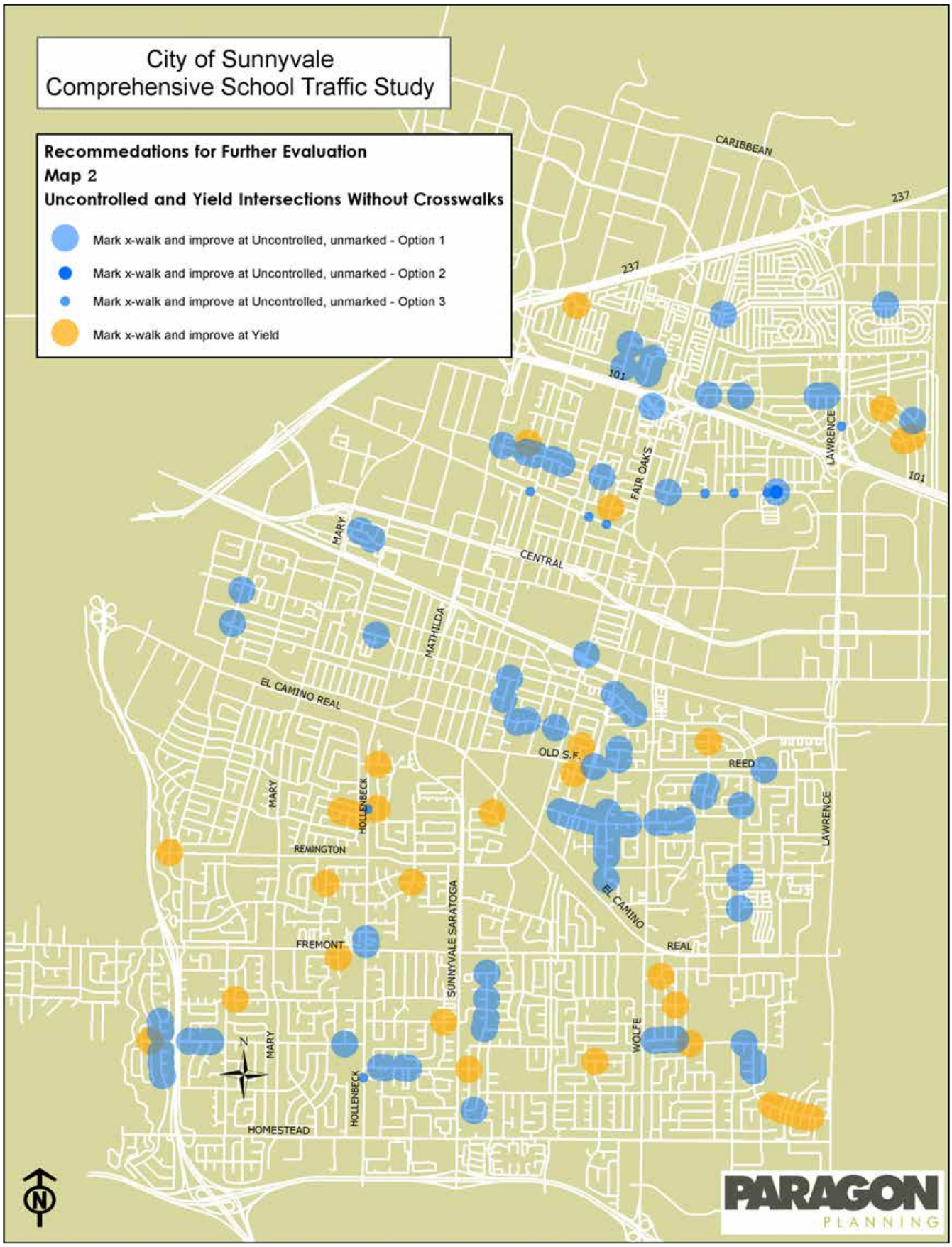
#	Uncontrolled no X-Walks Option 2	School
1	SANTA ROSALIA TE & E DUANE AV	San Miguel

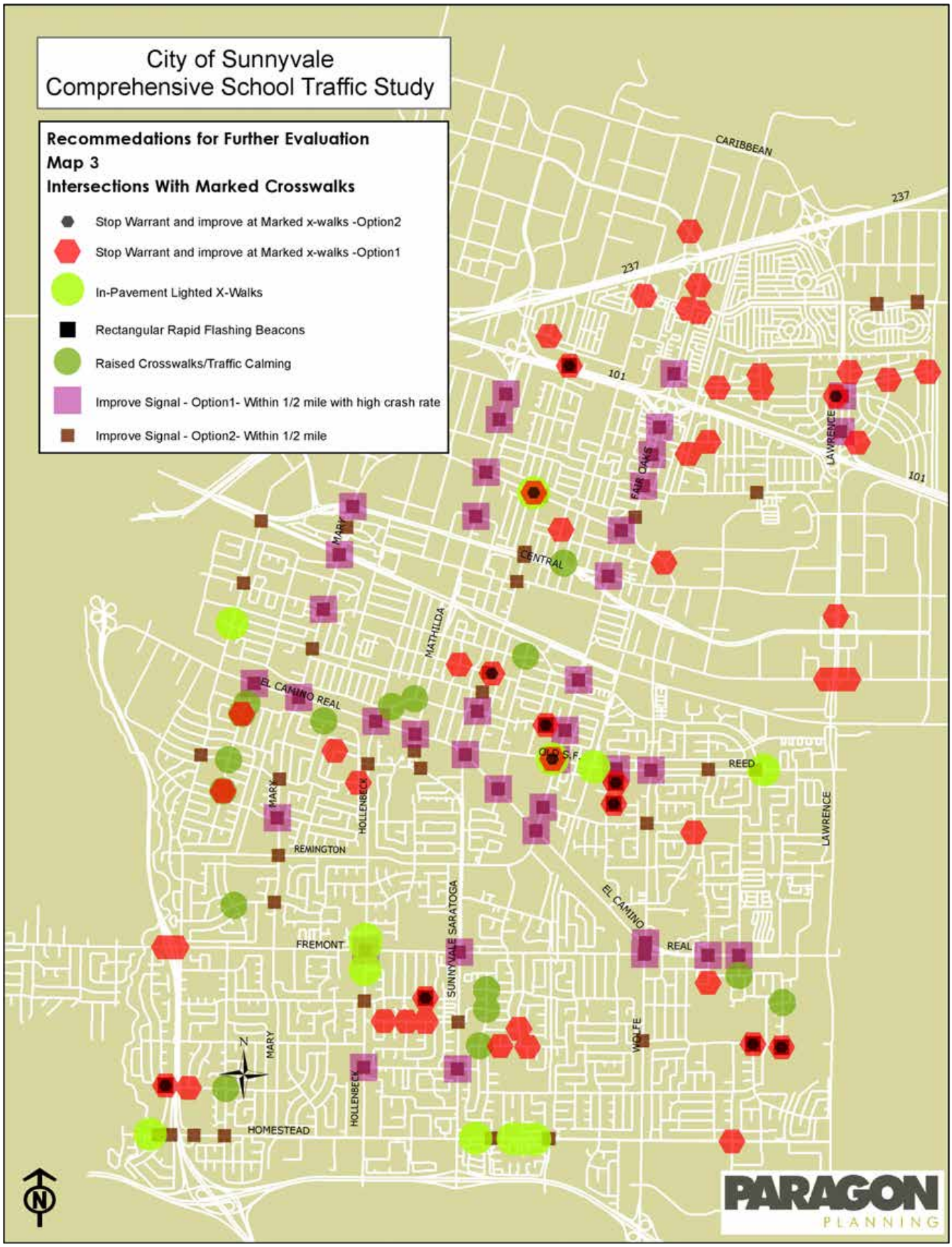
Improvements to Consider	**Install High Visibility Crosswalks, Advanced Yield Lines and In Street Signs, Conduct Stop Warrant Analysis**
Criteria	**All 1-way or 2-way stops , with speed limit under 40mph, on a school route, not on an arterial, with in ½ mile of a school, with 3 collisions in 1 year or 5 collisions in 2 years.**
Query	("Stop_Type" = '1-way' OR "Stop_Type" = '2-way') AND "SPEED" < 40 AND "School" <> 'not school' AND "In_half_mi" = 'yes' AND("Crash1yr" = 3 OR "Crash2yr" = 5) AND "Arterial" <> 'yes'
Result file name	Uncontrolled_Unmarked_crosswalks_Option3.shp 9 intersections
Map Label and Symbol	

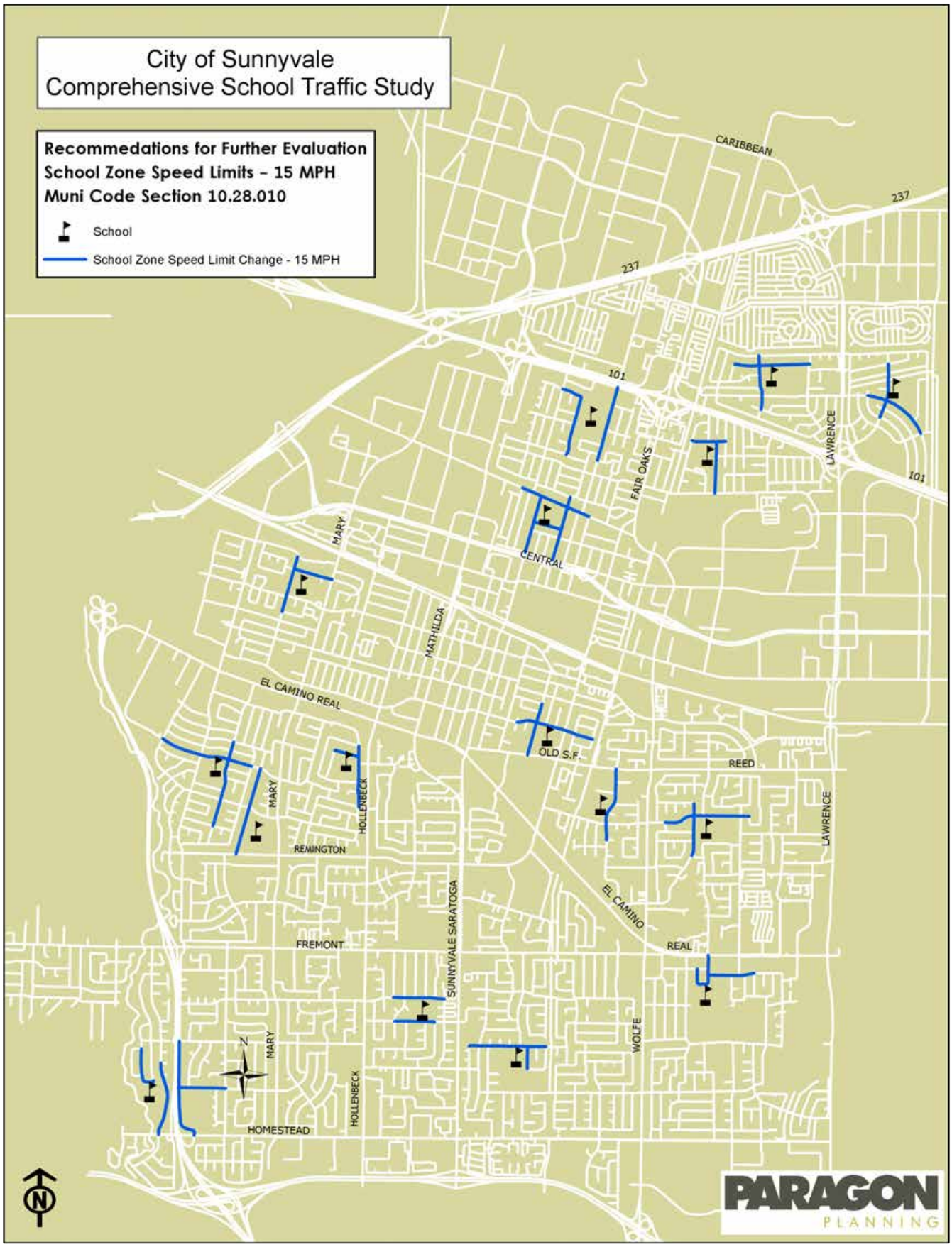
#	Uncontrolled no X-Walks Option 3	School
1	W MAUDE AV & N MURPHY AV	Bishop
2	ROOSEVELT AV & E MAUDE AV	Bishop
3	WORLEY AV & E MAUDE AV	Bishop
4	HARVARD AV & HOLLENBECK AV	Cumberland
5	LAWRENCE EX & LAKEWOOD DR & BRIDGEWOOD WY	Fairwood
6	E DUANE AV & SAN LUISITO WY	San Miguel
7	SANTA PAULA AV & E DUANE AV	San Miguel
8	E DUANE AV & SAN RAFAEL ST	San Miguel
9	GRAND COULEE AV & HOLLENBECK AV	West Valley

SECTION 4
Citywide Maps


City of Sunnyvale
Comprehensive School Traffic Study
Recommedations for Further Evaluation
Map 1
Stop Controlled Intersections Without Crosswalks
Mark x-walk at Stop - Option2 -within 1/2 mile
Mark x-walk at Stop - Option4- over 2k 3way and 4way stops
Mark x-walk at Stop - Option3 -within 1/4 mile
Mark x-walk at Stop - Option1-crashes and street class
CARIBBEAN
237
237
101
101
LAWRENCE
FAIR OAKS
MARY
MATHILDA
EL CAMINO REAL
OLD S.F.
REED
LAWRENCE
HOLLENBECK
REMINGTON
EL CAMINO
REAL
FREMONT
SUNNYVALE SARATOGA
MARY
HOLLENBECK
HOMESTEAD
N
PARAGON
PLANNING


City of Sunnyvale
Comprehensive School Traffic Study
Recommedations for Further Evaluation
Map 2
Uncontrolled and Yield Intersections Without Crosswalks
Mark x-walk and improve at Uncontrolled, unmarked - Option 1
Mark x-walk and improve at Uncontrolled, unmarked - Option 2
Mark x-walk and improve at Uncontrolled, unmarked - Option 3
Mark x-walk and improve at Yield
CARIBBEAN
237
237
101
101
LAWRENCE
FAIR OAKS
MARY
CENTRAL
MATHILDA
EL CAMINO REAL
OLD S.F.
REED
LAWRENCE
MARY
HOLLENBECK
REMINGTON
EL CAMINO
REAL
FREMONT
SUNNYVALE SARATOGA
WOLFE
MARY
HOLLENBECK
HOMESTEAD
N
PARAGON
PLANNING


City of Sunnyvale
Comprehensive School Traffic Study
Recommedations for Further Evaluation
Map 3
Intersections With Marked Crosswalks
Stop Warrant and improve at Marked x-walks -Option2
Stop Warrant and improve at Marked x-walks -Option1
In-Pavement Lighted X-Walks
Rectangular Rapid Flashing Beacons
Raised Crosswalks/Traffic Calming
Improve Signal - Option1- Within 1/2 mile with high crash rate
Improve Signal - Option2- Within 1/2 mile
CARIBBEAN
237
101
LAWRENCE
FAIR OAKS
MARY
CENTRAL
MATHILDA
EL CAMINO REAL
REED
HOLLENBECK
REMINGTON
SUNNYVALE SARATOGA
FREMONT
WOLFE
HOMESTEAD
N
PARAGON
PLANNING

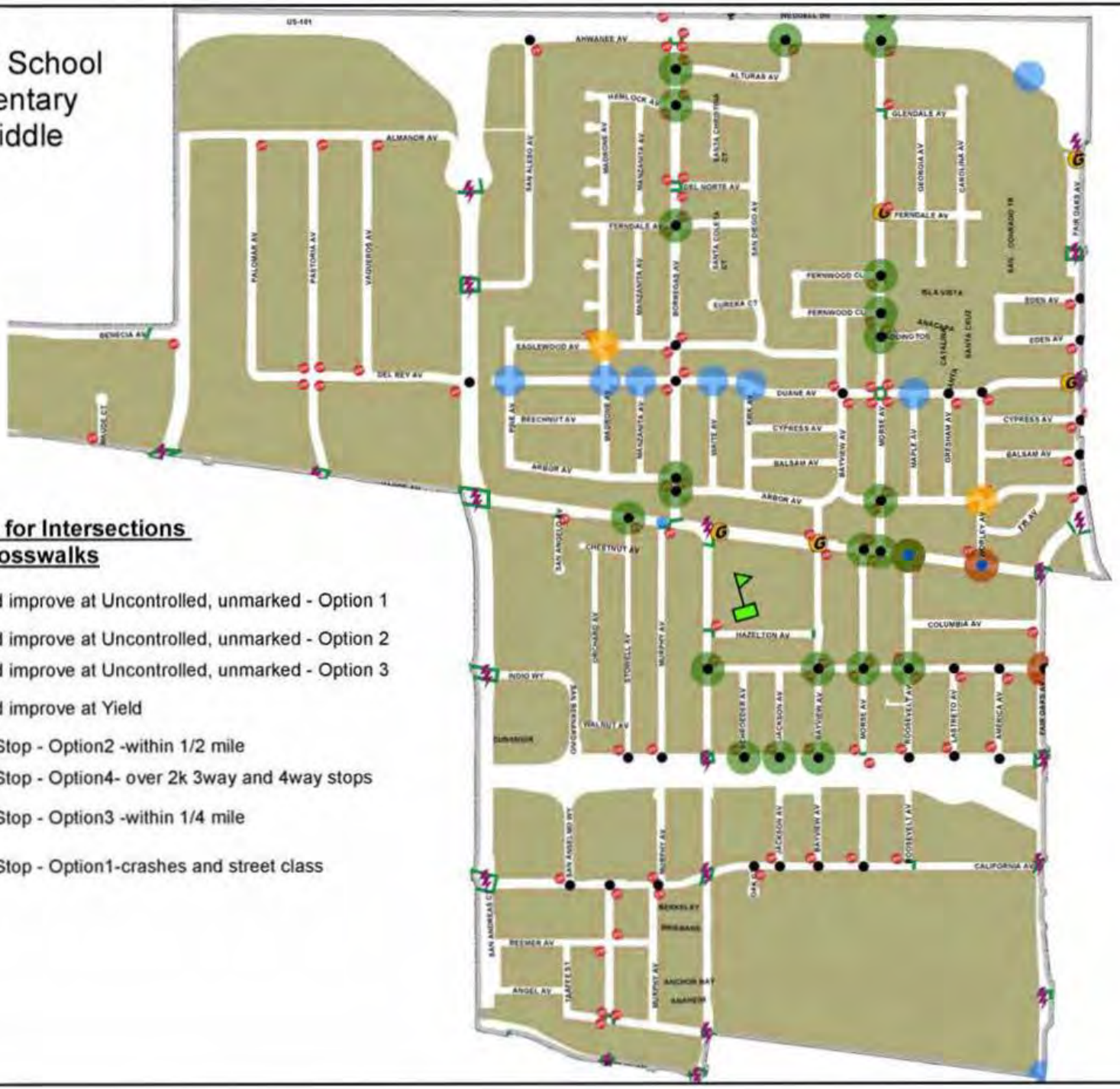

City of Sunnyvale
Comprehensive School Traffic Study
Recommedations for Further Evaluation
School Zone Speed Limits – 15 MPH
Muni Code Section 10.28.010
School
School Zone Speed Limit Change - 15 MPH
CARIBBEAN
237
237
101
101
LAWRENCE
FAIR OAKS
CENTRAL
MARY
MATHILDA
EL CAMINO REAL
OLD S.F.
REED
LAWRENCE
MARY
HOLLENBECK
REMINGTON
EL CAMINO
REAL
FREMONT
SUNNYVALE SARATOGA
WOLFE
MARY
HOLLENBECK
HOMESTEAD
N
PARAGON
PLANNING

SECTION 5
School Attendance Area Maps

SUNNYVALE SCHOOL DISTRICT

Bishop Elementary and Columbia Middle	Page 38–39
Cherry Chase Elementary	Page 40–41
Cumberland Elementary	Page 42–43
Ellis Elementary	Page 44–45
Fairwood Elementary	Page 46–47
Lakewood Elementary	Page 48–49
San Miguel Elementary	Page 50–51
Vargas Elementary	Page 52–53

Safe Routes to School
Bishop Elementary
Columbia Middle



Basemap

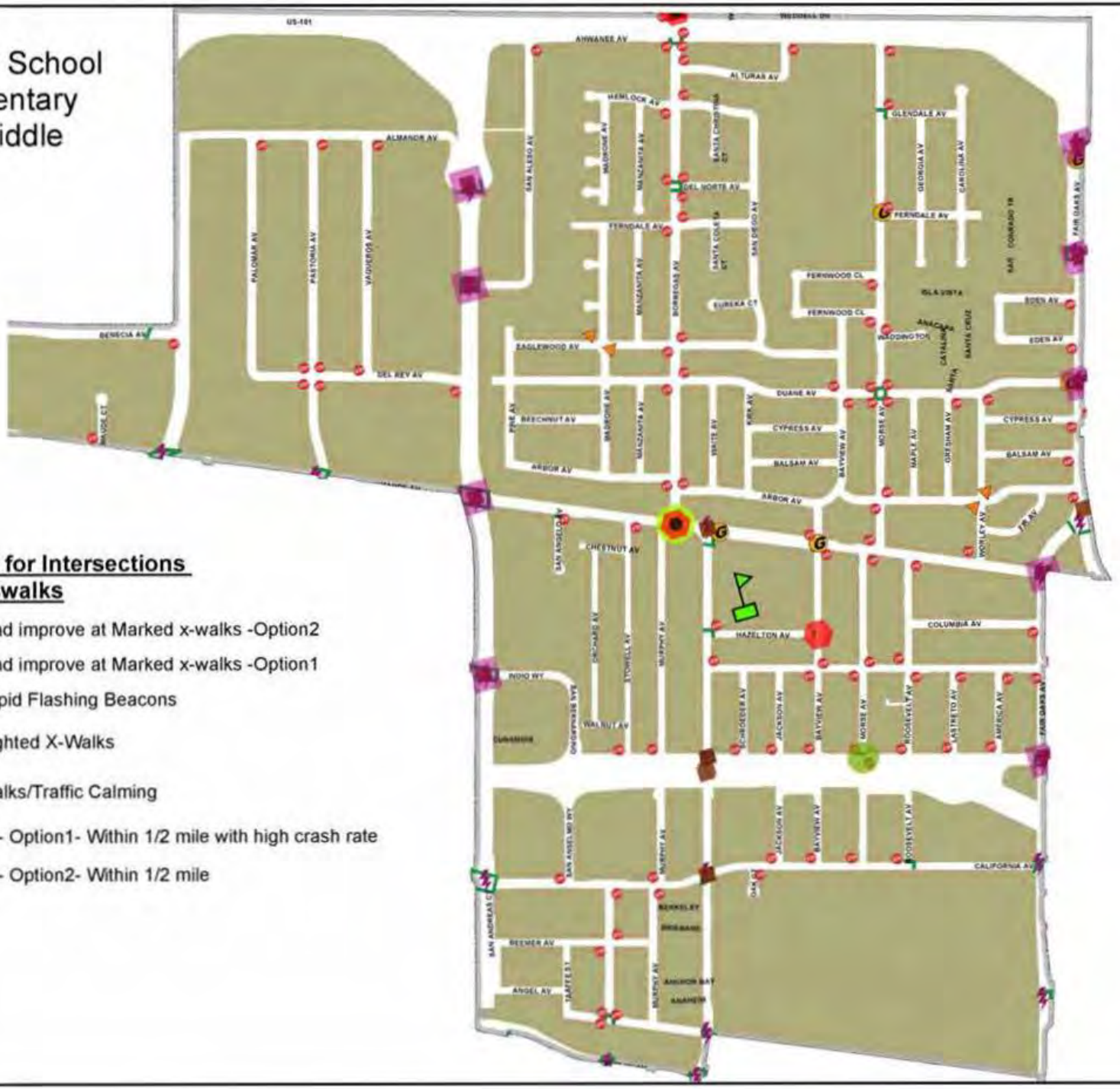
- Stop
- Traffic Signal
- Bishop Elementary
- Crossing Guard
- Yield Sign
- School Route
- Crosswalk

Recommendations for Intersections Without Marked Crosswalks

- Mark x-walk and improve at Uncontrolled, unmarked - Option 1
- Mark x-walk and improve at Uncontrolled, unmarked - Option 2
- Mark x-walk and improve at Uncontrolled, unmarked - Option 3
- Mark x-walk and improve at Yield
- Mark x-walk at Stop - Option2 -within 1/2 mile
- Mark x-walk at Stop - Option4- over 2k 3way and 4way stops
- Mark x-walk at Stop - Option3 -within 1/4 mile
- Mark x-walk at Stop - Option1-crashes and street class

PARAGON

Safe Routes to School
Bishop Elementary
Columbia Middle



Basemap

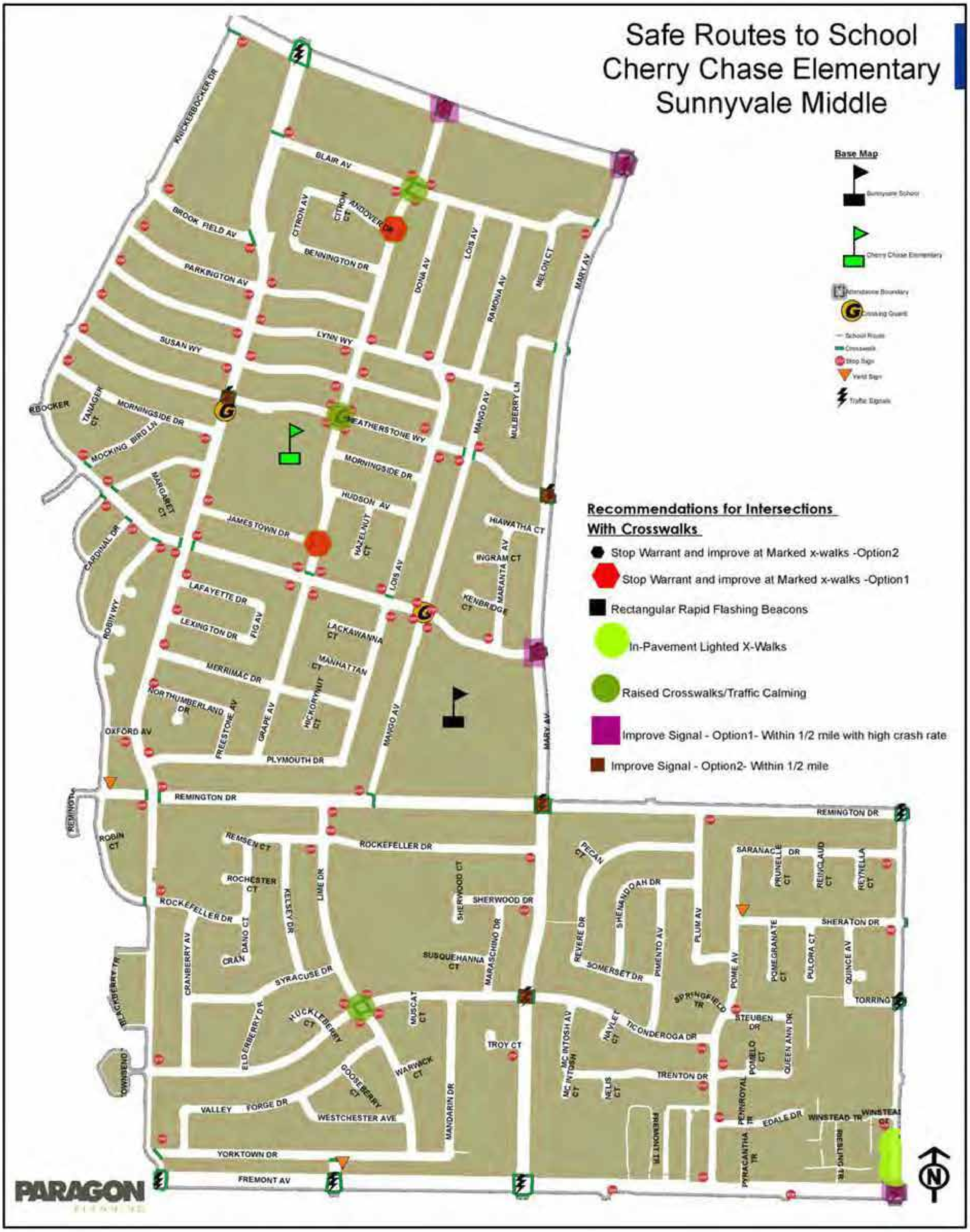
- Stop
- Traffic Signal
- Bishop Elementary
- Crossing Guard
- Yield Sign
- School Route
- Crosswalk

Recommendations for Intersections With Marked Crosswalks

- Stop Warrant and improve at Marked x-walks -Option2
- Stop Warrant and improve at Marked x-walks -Option1
- Rectangular Rapid Flashing Beacons
- In-Pavement Lighted X-Walks
- Raised Crosswalks/Traffic Calming
- Improve Signal - Option1- Within 1/2 mile with high crash rate
- Improve Signal - Option2- Within 1/2 mile

PARAGON


Safe Routes to School
Cherry Chase Elementary
Sunnyvale Middle
Base Map
Recommendations for Intersections Without Crosswalks
Mark x-walk and improve at Uncontrolled, unmarked - Option 1
Mark x-walk and improve at Uncontrolled, unmarked - Option 2
Mark x-walk and improve at Uncontrolled, unmarked - Option 3
Mark x-walk and improve at Yield
Mark x-walk at Stop - Option2 -within 1/2 mile
Mark x-walk at Stop - Option4- over 2k 3way and 4way stops
Mark x-walk at Stop - Option3 -within 1/4 mile
Mark x-walk at Stop - Option1-crashes and street class
KNICKERBOCKER DR
BLAIR AV
BROOK FIELD AV
CITRON AV
ANDOVER DR
BENNINGTON DR
PARKINGTON AV
DONA AV
LOIS AV
RAMONA AV
MELON CT
MARY AV
SUSAN WY
LYNN WY
MORNINGSIDE DR
MOCKING BIRD LN
FEATHERSTONE WY
MANGO AV
HUDSON AV
JAMESTOWN DR
CARDINAL DR
LAFAYETTE DR
LEXINGTON DR
FIG AV
KENBRIDGE CT
LACKAWANNA CT
MANHATTAN CT
MERRIMAC DR
NORTHUMBERLAND DR
FREESTONE AV
GRAPE AV
HICKORYNUT CT
ROBIN WY
OXFORD AV
PLYMOUTH DR
REMINGTON DR
ROCKEFELLER DR
ROCHESTER CT
KELSEY DR
LIME DR
SHERWOOD CT
SHERWOOD DR
PECAN CT
SHENANDOAH DR
REVERE DR
PIMENTO AV
PLUM AV
SARANAC DR
SHERATON DR
POME AV
SUSQUEHANNA CT
MARASCHINO DR
SOMERSET DR
SPRINGFIELD TR
CRANBERRY AV
SYRACUSE DR
HUCKLEBERRY CT
ELDERBERRY DR
MUSCAT CT
TICONDEROGA DR
STEUBEN DR
TORRINGTON
TROY CT
MC INTOSH AV
TRENTON DR
GOOSEBERRY CT
WARWICK CT
VALLEY FORGE DR
WESTCHESTER AVE
MANDARIN DR
PENNYROYAL TR
EDALE DR
WINSTEAD TR
YORKTOWN DR
FREMONT AV
BLACKBERRY TR
PARAGON


Safe Routes to School
Cherry Chase Elementary
Sunnyvale Middle
Base Map
Recommendations for Intersections With Crosswalks
Stop Warrant and improve at Marked x-walks -Option2
Stop Warrant and improve at Marked x-walks -Option1
Rectangular Rapid Flashing Beacons
In-Pavement Lighted X-Walks
Raised Crosswalks/Traffic Calming
Improve Signal - Option1- Within 1/2 mile with high crash rate
Improve Signal - Option2- Within 1/2 mile
KNICKERBOCKER DR
BLAIR AV
BROOK FIELD AV
PARKINGTON AV
SUSAN WY
LYNN WY
MORNINGSIDE DR
MOCKING BIRD LN
FEATHERSTONE WY
HUDSON AV
JAMES TOWN DR
LAFAYETTE DR
LEXINGTON DR
MERRIMAC DR
OXFORD AV
PLYMOUTH DR
REMINGTON DR
ROCKEFELLER DR
SHERWOOD DR
SHERATON DR
SYRACUSE DR
TICONDEROGA DR
TRENTON DR
VALLEY FORGE DR
WESTCHESTER AVE
YORKTOWN DR
FREMONT AV
MANGO AV
MARY AV
LOIS AV
DONA AV
RAMONA AV
CITRON AV
BENNINGTON DR
HIAWATHA CT
INGRAM CT
KENBRIDGE CT
LACKAWANNA CT
MANHATTAN CT
GRAPE AV
FREESTONE AV
CRANBERRY AV
ELDERBERRY DR
HUCKLEBERRY CT
GOOSEBERRY CT
WARWICK CT
MANDARIN DR
TROY CT
SOMERSET DR
SHENANDOAH DR
PLUM AV
POME AV
QUINCE AV
STEUBEN DR
WINSTEAD TR
EDALE DR
PARAGON

Safe Routes to School
Cumberland Elementary

(Sunnyvale Middle School Feeder School)

PARAGON PLANNING

Base Map

- Cumberland Elementary
- Attendance Boundary
- School Route
- Crossing Guard
- Crosswalk
- Traffic Signals
- Stop Sign
- Yield Sign

Recommendations for Intersections Without Crosswalks

- Mark x-walk and improve at Uncontrolled, unmarked - Option 1
- Mark x-walk and improve at Uncontrolled, unmarked - Option 2
- Mark x-walk and improve at Uncontrolled, unmarked - Option 3
- Mark x-walk and improve at Yield
- Mark x-walk at Stop - Option2 -within 1/2 mile
- Mark x-walk at Stop - Option4- over 2k 3way and 4way stops
- Mark x-walk at Stop - Option3 -within 1/4 mile
- Mark x-walk at Stop - Option1-crashes and street class

Safe Routes to School
Cumberland Elementary

(Sunnyvale Middle School Feeder School)

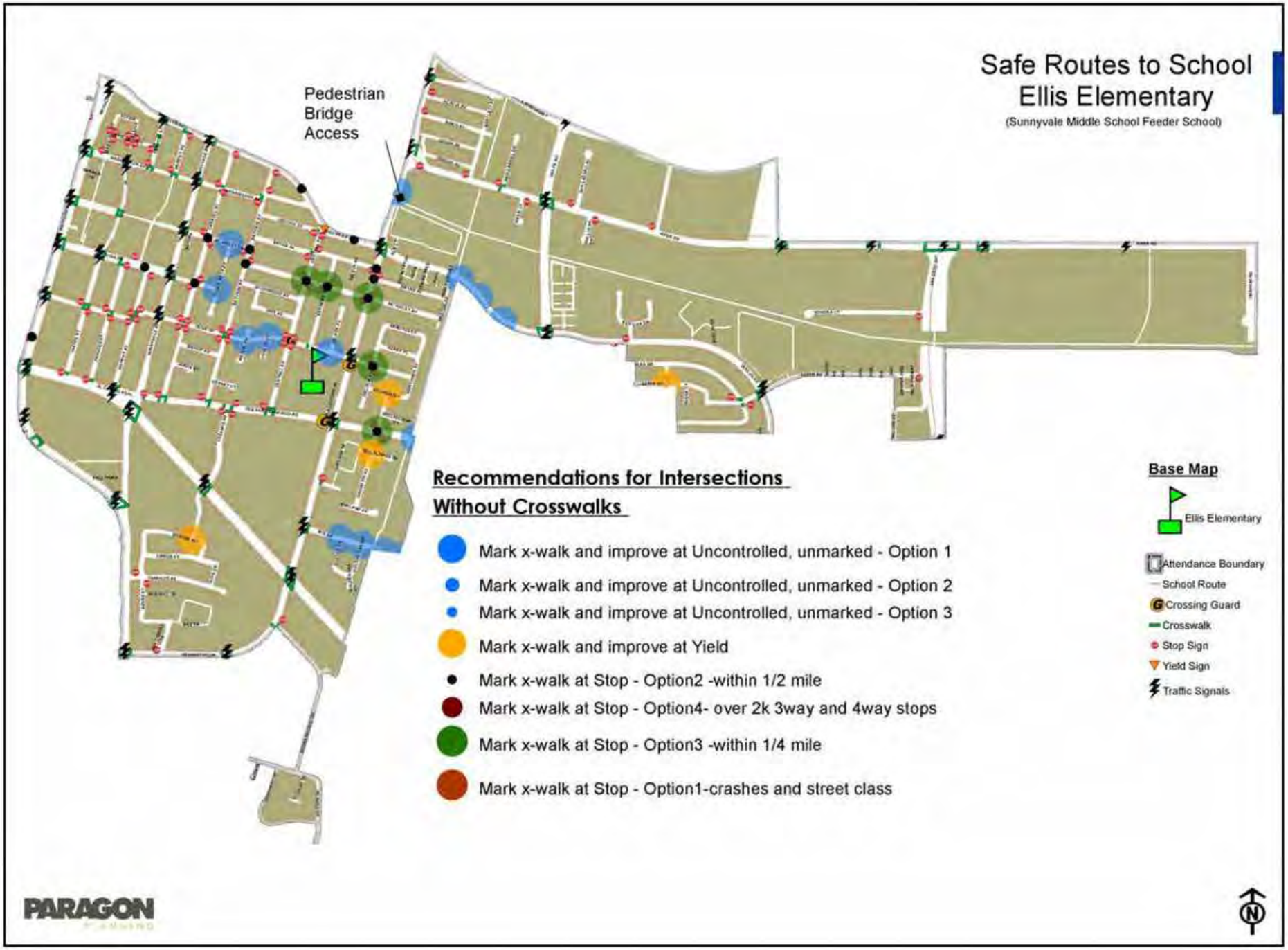
PARAGON

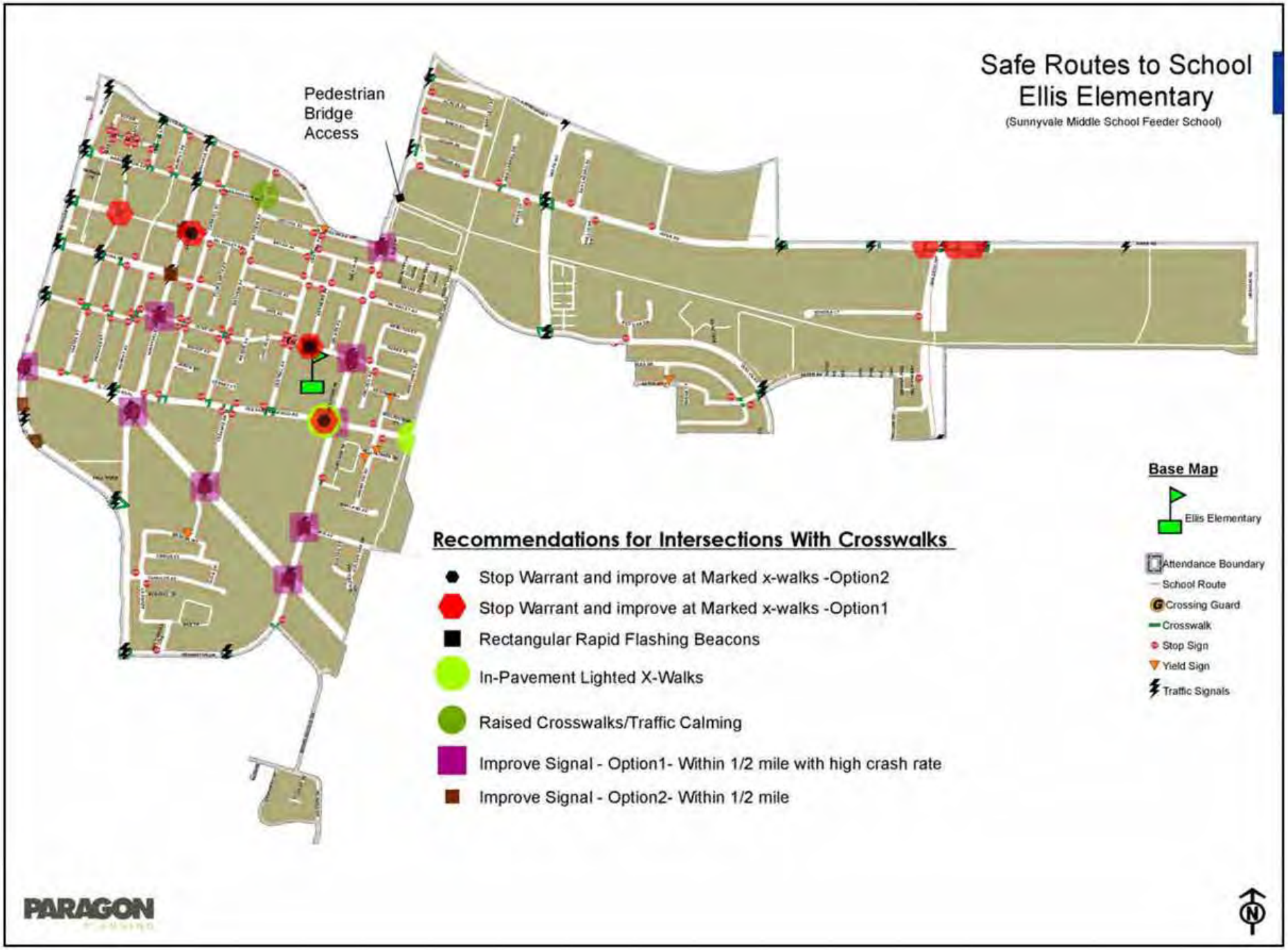
Base Map

- Cumberland Elementary
- Attendance Boundary
- School Route
- Crossing Guard
- Crosswalk
- Traffic Signals
- Stop Sign
- Yield Sign

Recommendations for Intersections With Crosswalks

- Stop Warrant and improve at Marked x-walks -Option2
- Stop Warrant and improve at Marked x-walks -Option1
- Rectangular Rapid Flashing Beacons
- In-Pavement Lighted X-Walks
- Raised Crosswalks/Traffic Calming
- Improve Signal - Option1- Within 1/2 mile with high crash rate
- Improve Signal - Option2- Within 1/2 mile


Safe Routes to School
Ellis Elementary
(Sunnyvale Middle School Feeder School)
Pedestrian Bridge Access
Recommendations for Intersections Without Crosswalks
Mark x-walk and improve at Uncontrolled, unmarked - Option 1
Mark x-walk and improve at Uncontrolled, unmarked - Option 2
Mark x-walk and improve at Uncontrolled, unmarked - Option 3
Mark x-walk and improve at Yield
Mark x-walk at Stop - Option2 -within 1/2 mile
Mark x-walk at Stop - Option4- over 2k 3way and 4way stops
Mark x-walk at Stop - Option3 -within 1/4 mile
Mark x-walk at Stop - Option1-crashes and street class
Base Map
Ellis Elementary
Attendance Boundary
School Route
Crossing Guard
Crosswalk
Stop Sign
Yield Sign
Traffic Signals
PARAGON
PLANNING
N


Safe Routes to School
Ellis Elementary
(Sunnyvale Middle School Feeder School)
Pedestrian
Bridge
Access
Recommendations for Intersections With Crosswalks
Stop Warrant and improve at Marked x-walks -Option2
Stop Warrant and improve at Marked x-walks -Option1
Rectangular Rapid Flashing Beacons
In-Pavement Lighted X-Walks
Raised Crosswalks/Traffic Calming
Improve Signal - Option1- Within 1/2 mile with high crash rate
Improve Signal - Option2- Within 1/2 mile
Base Map
Ellis Elementary
Attendance Boundary
School Route
Crossing Guard
Crosswalk
Stop Sign
Yield Sign
Traffic Signals
PARAGON
N

Safe Routes to School
Fairwood Elementary

(Columbia Middle School Feeder School)

Basemap

Fairwood Elementary

Stop Sign

Yield Sign

Traffic Signals

Traffic Signals

Crossing Guard

School Route

Crosswalk

Recommendations for Intersections Without Marked Crosswalks

- Mark x-walk and improve at Uncontrolled, unmarked - Option 1
- Mark x-walk and improve at Uncontrolled, unmarked - Option 2
- Mark x-walk and improve at Uncontrolled, unmarked - Option 3
- Mark x-walk and improve at Yield
- Mark x-walk at Stop - Option2 -within 1/2 mile
- Mark x-walk at Stop - Option4- over 2k 3way and 4way stops
- Mark x-walk at Stop - Option3 -within 1/4 mile
- Mark x-walk at Stop - Option1-crashes and street class

Pedestrian Bridge Access

PARAGON

Safe Routes to School
Fairwood Elementary

(Columbia Middle School Feeder School)

Basemap

Fairwood Elementary

Stop Sign

Yield Sign

Traffic Signals

Traffic Signals

Crossing Guard

School Route

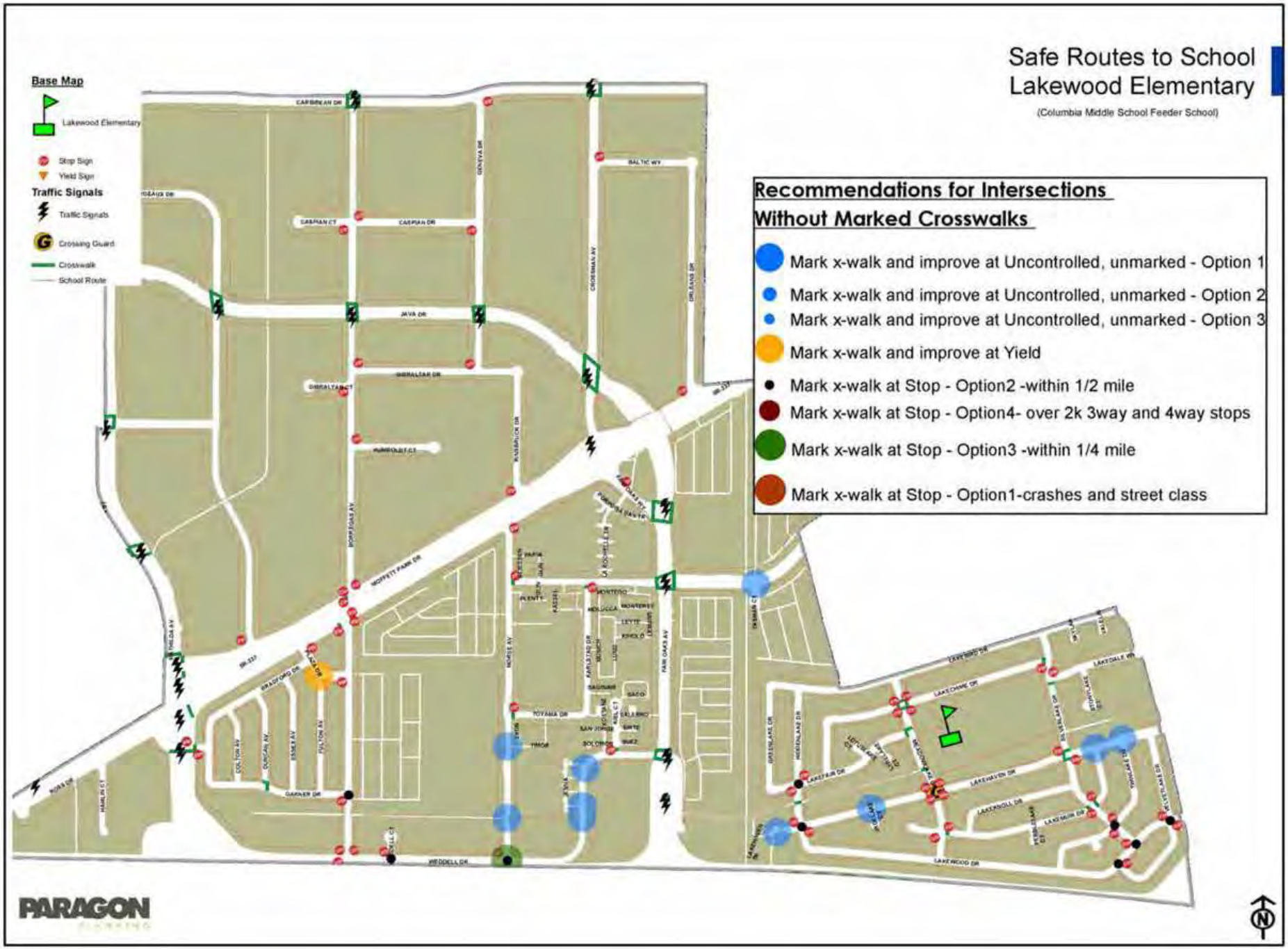
Crosswalk

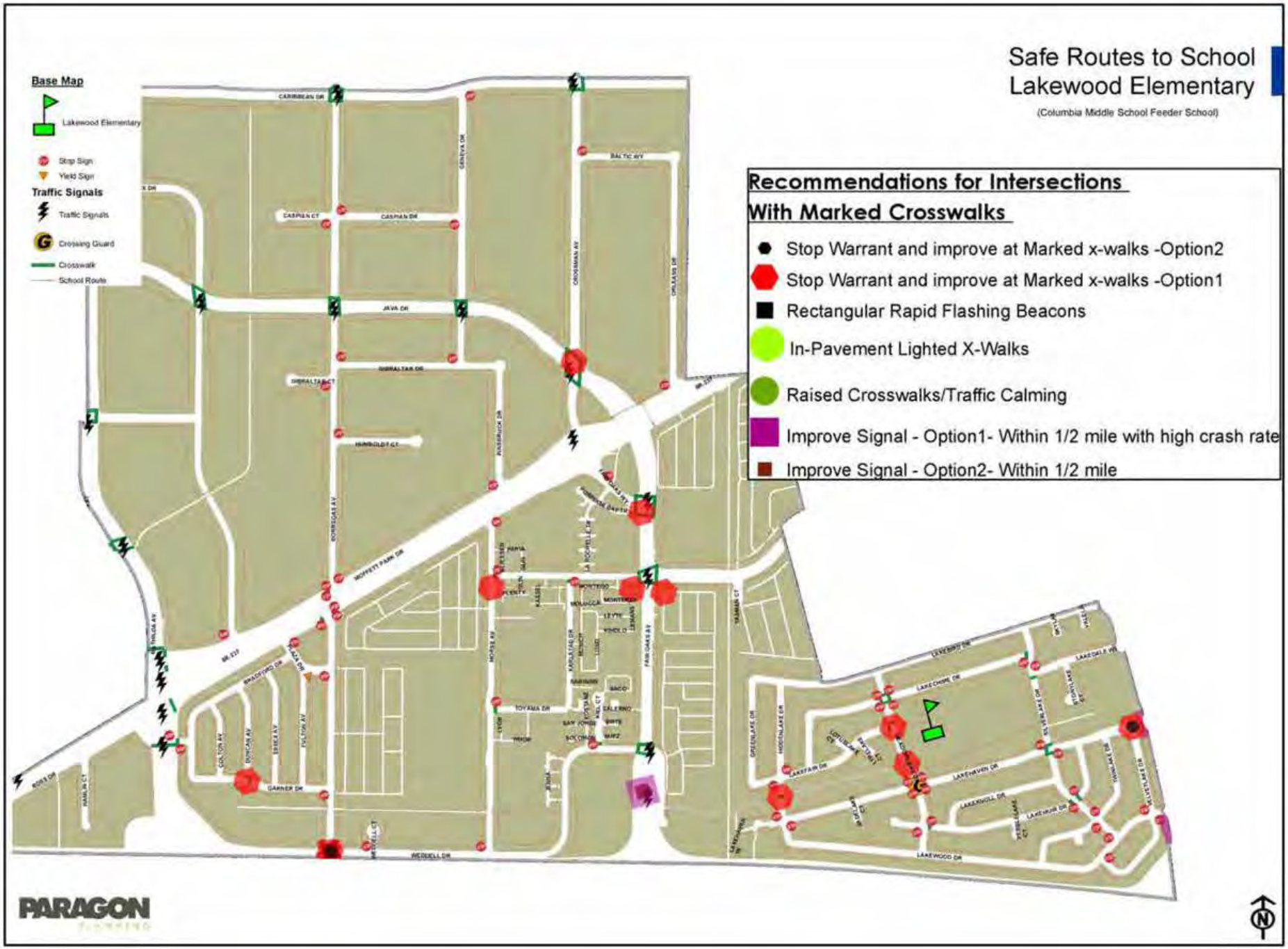
Recommendations for Intersections With Marked Crosswalks

- Stop Warrant and improve at Marked x-walks -Option2
- Stop Warrant and improve at Marked x-walks -Option1
- Rectangular Rapid Flashing Beacons
- In-Pavement Lighted X-Walks
- Raised Crosswalks/Traffic Calming
- Improve Signal - Option1- Within 1/2 mile with high crash rate
- Improve Signal - Option2- Within 1/2 mile

Pedestrian Bridge Access

PARAGON


Safe Routes to School
Lakewood Elementary
(Columbia Middle School Feeder School)
Base Map
Lakewood Elementary
Stop Sign
Yield Sign
Traffic Signals
Traffic Signals
Crossing Guard
Crosswalk
School Route
Recommendations for Intersections
Without Marked Crosswalks
Mark x-walk and improve at Uncontrolled, unmarked - Option 1
Mark x-walk and improve at Uncontrolled, unmarked - Option 2
Mark x-walk and improve at Uncontrolled, unmarked - Option 3
Mark x-walk and improve at Yield
Mark x-walk at Stop - Option2 -within 1/2 mile
Mark x-walk at Stop - Option4- over 2k 3way and 4way stops
Mark x-walk at Stop - Option3 -within 1/4 mile
Mark x-walk at Stop - Option1-crashes and street class
PARAGON

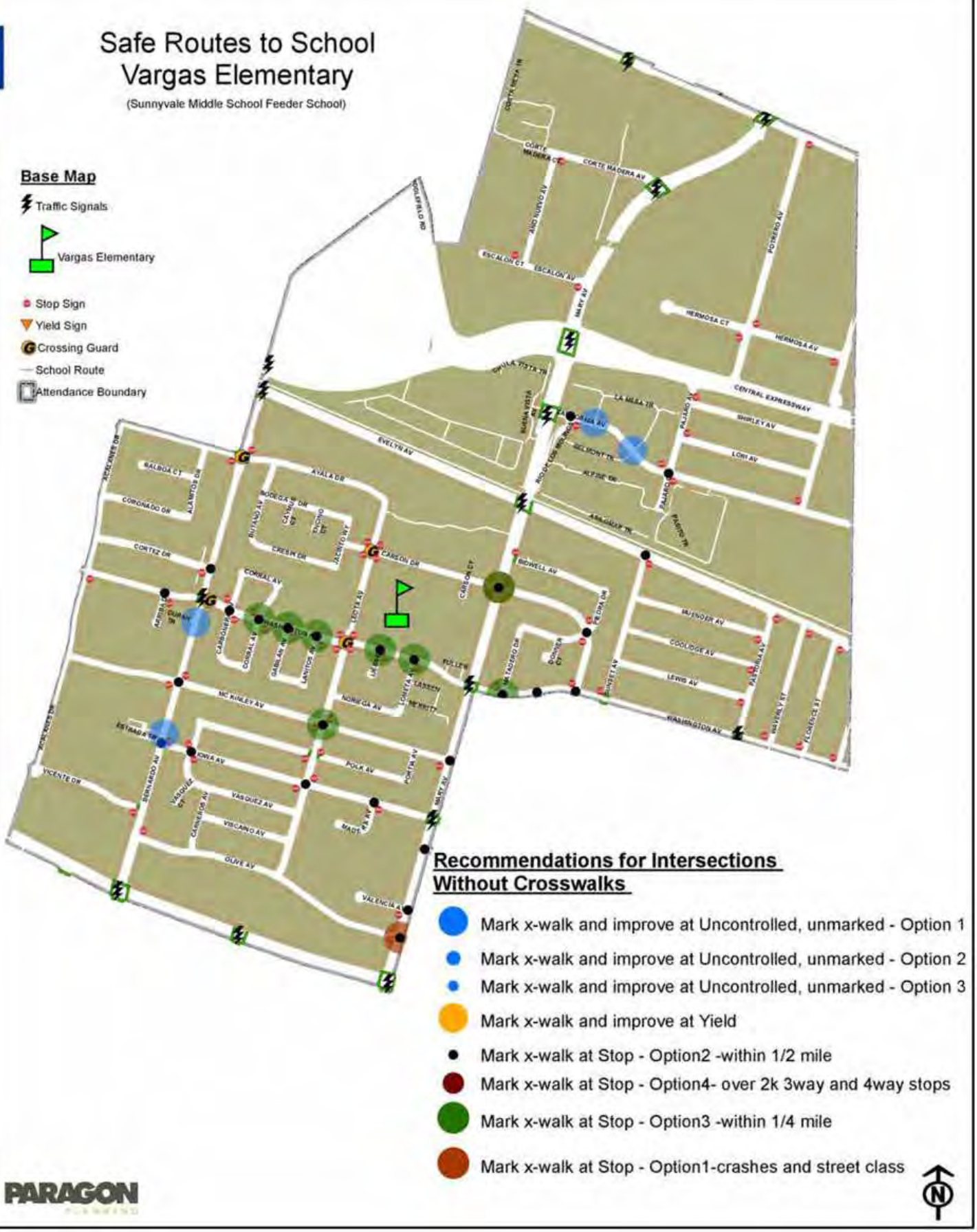

Safe Routes to School
Lakewood Elementary
(Columbia Middle School Feeder School)
Base Map
Lakewood Elementary
Stop Sign
Yield Sign
Traffic Signals
Traffic Signals
Crossing Guard
Crosswalk
School Route
Recommendations for Intersections With Marked Crosswalks
Stop Warrant and improve at Marked x-walks -Option2
Stop Warrant and improve at Marked x-walks -Option1
Rectangular Rapid Flashing Beacons
In-Pavement Lighted X-Walks
Raised Crosswalks/Traffic Calming
Improve Signal - Option1- Within 1/2 mile with high crash rate
Improve Signal - Option2- Within 1/2 mile
PARAGON
PLANNING

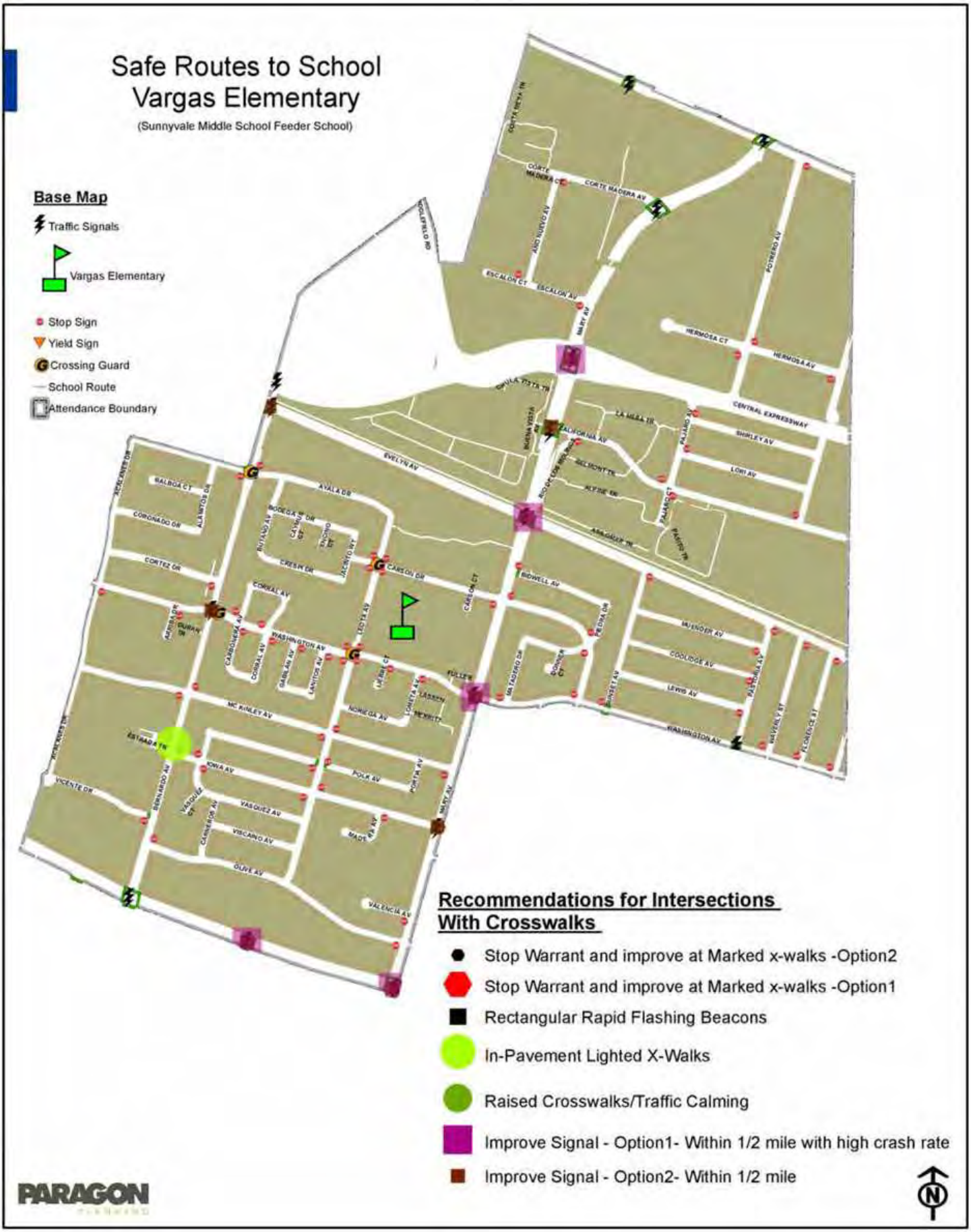

Base Map
San Miguel Elementary
Attendance Boundary
School Route
Crossing Guard
Crosswalk
Traffic Signals
Stop Sign
Yield Sign
Safe Routes to School
San Miguel Elementary
(Columbia Middle School Feeder School)
Recommendations for Intersections Without Marked Crosswalks
Mark x-walk and improve at Uncontrolled, unmarked - Option 1
Mark x-walk and improve at Uncontrolled, unmarked - Option 2
Mark x-walk and improve at Uncontrolled, unmarked - Option 3
Mark x-walk and improve at Yield
Mark x-walk at Stop - Option2 -within 1/2 mile
Mark x-walk at Stop - Option4- over 2k 3way and 4way stops
Mark x-walk at Stop - Option3 -within 1/4 mile
Mark x-walk at Stop - Option1-crashes and street class
PARAGON
PLANNING


Base Map
San Miguel Elementary
Attendance Boundary
School Route
Crossing Guard
Crosswalk
Traffic Signals
Stop Sign
Yield Sign
Safe Routes to School
San Miguel Elementary
(Columbia Middle School Feeder School)
Recommendations for Intersections With Marked Crosswalks
Stop Warrant and improve at Marked x-walks -Option2
Stop Warrant and improve at Marked x-walks -Option1
Rectangular Rapid Flashing Beacons
In-Pavement Lighted X-Walks
Raised Crosswalks/Traffic Calming
Improve Signal - Option1- Within 1/2 mile with high crash rate
Improve Signal - Option2- Within 1/2 mile
PARAGON
PLANNING

Safe Routes to School
Vargas Elementary

(Sunnyvale Middle School Feeder School)




Safe Routes to School
Vargas Elementary
(Sunnyvale Middle School Feeder School)
Base Map
Traffic Signals
Vargas Elementary
Stop Sign
Yield Sign
Crossing Guard
School Route
Attendance Boundary
Recommendations for Intersections With Crosswalks
Stop Warrant and improve at Marked x-walks -Option2
Stop Warrant and improve at Marked x-walks -Option1
Rectangular Rapid Flashing Beacons
In-Pavement Lighted X-Walks
Raised Crosswalks/Traffic Calming
Improve Signal - Option1- Within 1/2 mile with high crash rate
Improve Signal - Option2- Within 1/2 mile
PARAGON

CUPERTINO UNION SCHOOL DISTRICT

Nimitz Elementary	Page 55–56
Stockleir Elementary	Page 56–57
West Valley Elementary	Page 58–59

Safe Routes to School
Nimitz Elementary

(Cupertino Union School District)

Recommendations for Intersections Without Crosswalks

- Mark x-walk and improve at Uncontrolled, unmarked - Option 1
- Mark x-walk and improve at Uncontrolled, unmarked - Option 2
- Mark x-walk and improve at Uncontrolled, unmarked - Option 3
- Mark x-walk and improve at Yield
- Mark x-walk at Stop - Option2 -within 1/2 mile
- Mark x-walk at Stop - Option4- over 2k 3way and 4way stops
- Mark x-walk at Stop - Option3 -within 1/4 mile
- Mark x-walk at Stop - Option1-crashes and street class

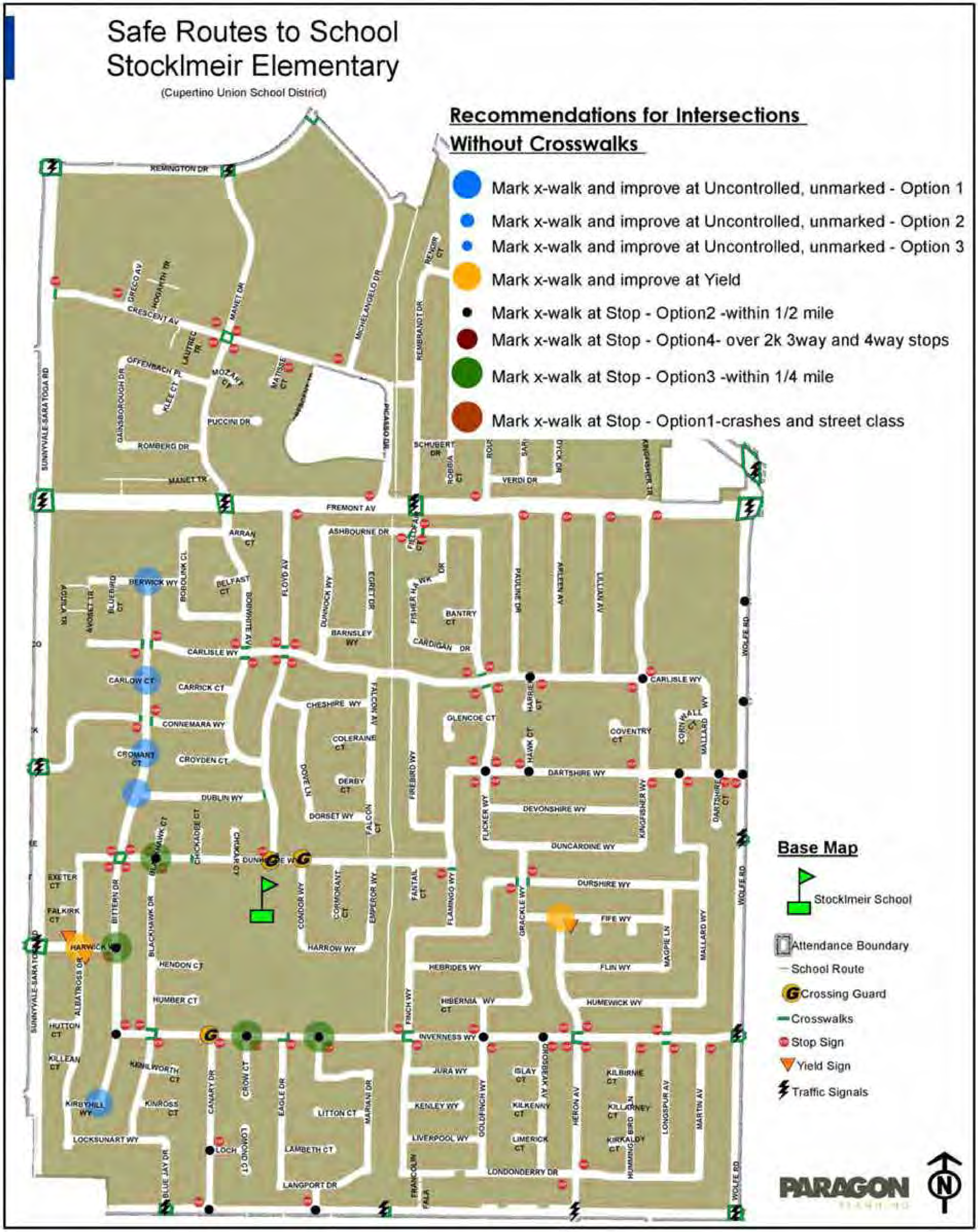
Base Map

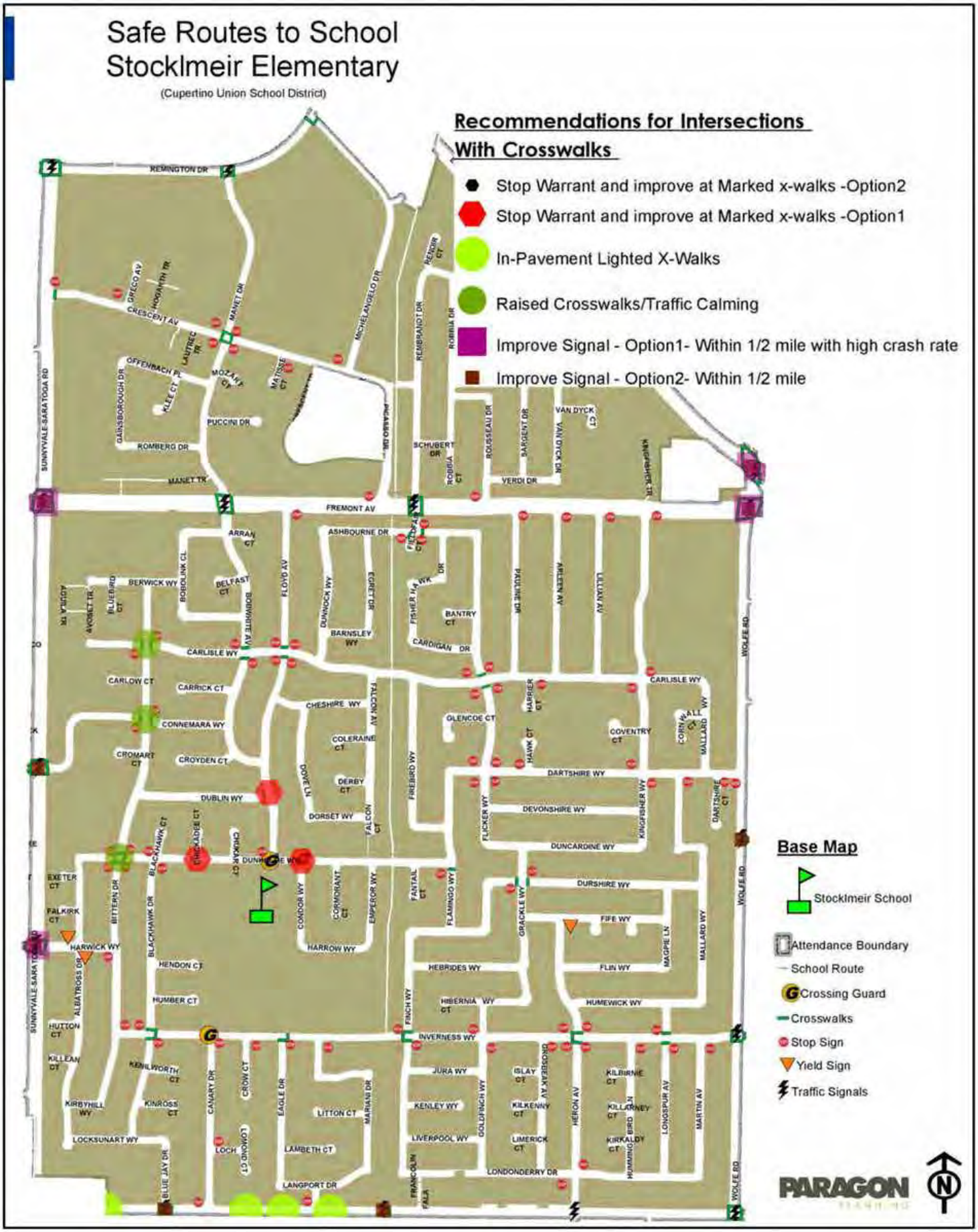
- Nimitz School
- Traffic Signals
- Stop Sign
- Yield Sign
- Crossing Guard
- Crosswalk
- School Route
- Attendance Boundary

PARAGON PLANNING

Safe Routes to School
Nimitz Elementary

(Cupertino Union School District)

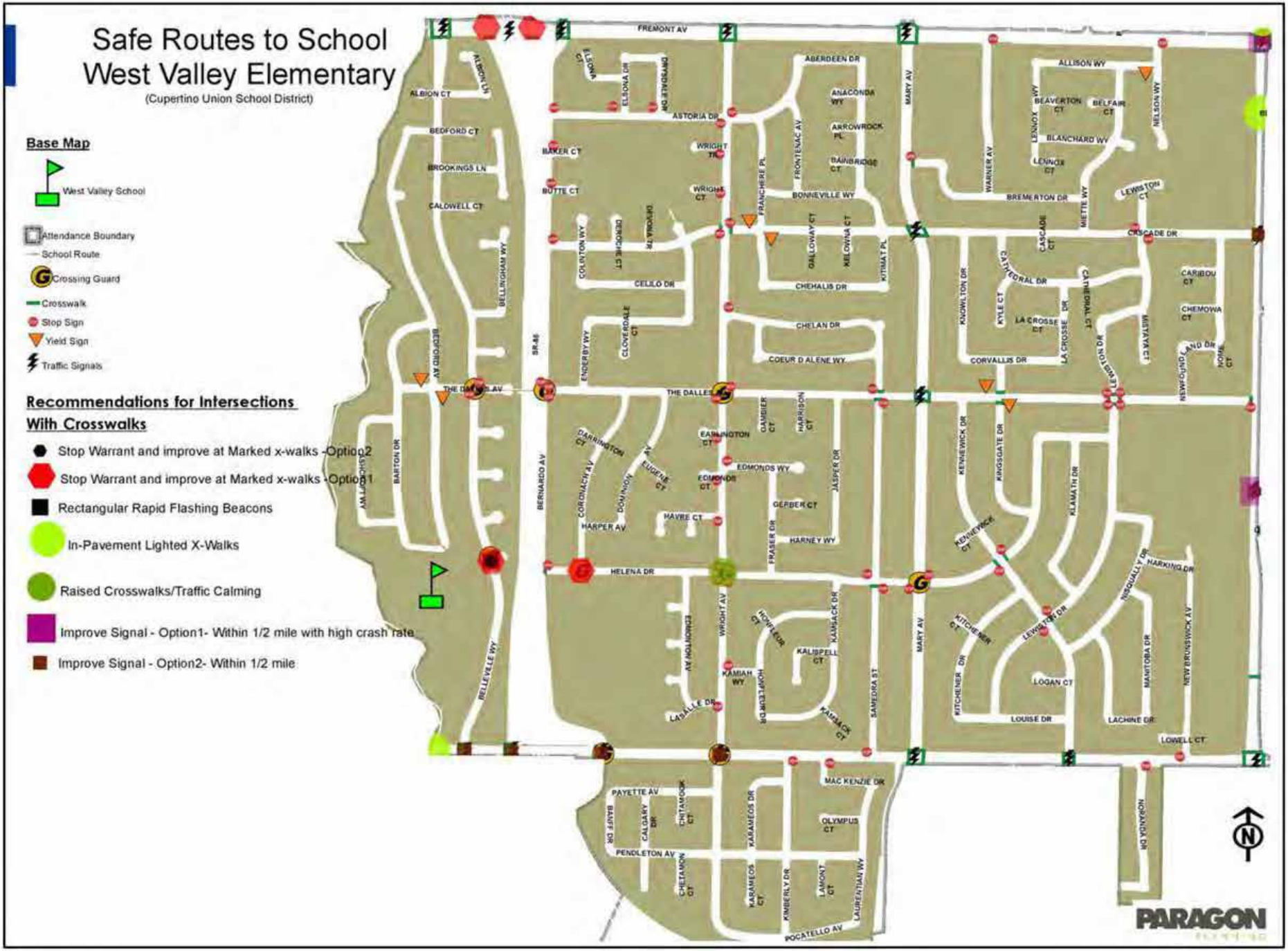

Safe Routes to School
Stocklmeir Elementary
(Cupertino Union School District)
Recommendations for Intersections Without Crosswalks
Mark x-walk and improve at Uncontrolled, unmarked - Option 1
Mark x-walk and improve at Uncontrolled, unmarked - Option 2
Mark x-walk and improve at Uncontrolled, unmarked - Option 3
Mark x-walk and improve at Yield
Mark x-walk at Stop - Option2 -within 1/2 mile
Mark x-walk at Stop - Option4- over 2k 3way and 4way stops
Mark x-walk at Stop - Option3 -within 1/4 mile
Mark x-walk at Stop - Option1-crashes and street class
Base Map
Stocklmeir School
Attendance Boundary
School Route
Crossing Guard
Crosswalks
Stop Sign
Yield Sign
Traffic Signals
PARAGON
N
REMINGTON DR
CRESCENT AV
FREMONT AV
SUNNYVALE-SARATOGA RD
WOLFE RD
CARLISLE WY
DARTSHIRE WY
DUNCARDINE WY
DURSHIRE WY
INVERNESS WY
LONDONDERRY DR
HARWICK WY
BERWICK WY
CARLOW CT
CROMART CT
KIRBYHILL WY
FIFE WY


Safe Routes to School
Stocklmeir Elementary
(Cupertino Union School District)
Recommendations for Intersections With Crosswalks
Stop Warrant and improve at Marked x-walks -Option2
Stop Warrant and improve at Marked x-walks -Option1
In-Pavement Lighted X-Walks
Raised Crosswalks/Traffic Calming
Improve Signal - Option1- Within 1/2 mile with high crash rate
Improve Signal - Option2- Within 1/2 mile
Base Map
Stocklmeir School
Attendance Boundary
School Route
Crossing Guard
Crosswalks
Stop Sign
Yield Sign
Traffic Signals
PARAGON
REMINGTON DR
CRESCENT AV
PUCCINI DR
ROMBERG DR
MANET TR
FREMONT AV
ASHBOURNE DR
CARLISLE WY
CARLOW CT
CARRICK CT
CONNEMARA WY
CROMART CT
CROYDEN CT
DUBLIN WY
DORSET WY
CHESHIRE WY
COLERAINE CT
DERBY CT
CARDIGAN DR
BANTRY CT
BARNSLEY WY
GLENCOE CT
COVENTRY CT
DARTSHIRE WY
DEVONSHIRE WY
DUNCARDINE WY
DURSHIRE WY
FIFE WY
HARROW WY
HENDON CT
HUMBER CT
HEBRIDES WY
HIBERNIA WY
HUMEWICK WY
INVERNESS WY
JURA WY
KENLEY WY
LIVERPOOL WY
LONDONDERRY DR
LANGPORT DR
LAMBETH CT
LITTON CT
KENILWORTH CT
KINROSS CT
KIRBYHILL WY
LOCKSUNART WY
KILLEAN CT
HUTTON CT
EXETER CT
FALKIRK CT
HARWICK WY
BERWICK WY
BELFAST CT
ARRAN CT
CARLISLE WY
WOLFE RD
SUNNYVALE-SARATOGA RD
MICHELANGELO DR
SCHUBERT DR
VERDI DR
VAN DYCK CT
ROSSEAU DR
SARGENT DR
VAN DYCK DR
FLOYD AV
DUNNOCK WY
EGRET DR
FISHER HAWK DR
PAULINE DR
ARLEEN AV
LULLAN AV
HARRIER CT
HAWK CT
FALCON AV
FALCON CT
FIREBIRD WY
COVELL CT
FLICKER WY
KINGFISHER WY
GRACKLE WY
MALLARD WY
MAGPIE LN
FINCH WY
CONDOR WY
CORMORANT CT
EMPEROR WY
FANTAIL CT
FLAMINGO WY
BLACKHAWK DR
BLACKHAWK CT
CHICKADEE CT
CHICKAREE CT
BITTERN DR
ALBATROSS DR
CANARY DR
CROW CT
EAGLE DR
MARIANI DR
LOCH
LOMOND CT
BLUE JAY DR
FRANCOLIN
FALA
GOLDFINCH WY
CONDOR AV
ISLAY CT
KILKENNY CT
LIMERICK CT
KILBIRNIE CT
KILLARNEY CT
KIRKALDY CT
HERON AV
HUMMING BIRD
LONGSPUR AV
MARTIN AV
MOZART CT
MATISSE CT
OFFENBACH PL
KLEE CT
GAINSBOROUGH DR
GRECO AV
HOGARTH TR
LAUTREC TR
MANET DR
RENOIR CT
REMBRANDT DR
ROBBIA DR
ROBBIA CT
PISSARRO DR
BOBOLINK CL
BLUEBIRD CT
ADORA TR
ARIOSA TR
DOMINGUEZ AV

Safe Routes to School
West Valley Elementary
(Cupertino Union School District)
Base Map
West Valley School
Attendance Boundary
School Route
Crossing Guard
Crosswalk
Stop Sign
Yield Sign
Traffic Signals
Recommendations for Intersections Without Crosswalks
Mark x-walk and improve at Uncontrolled, unmarked - Option 1
Mark x-walk and improve at Uncontrolled, unmarked - Option 2
Mark x-walk and improve at Uncontrolled, unmarked - Option 3
Mark x-walk and improve at Yield
Mark x-walk at Stop - Option2 -within 1/2 mile
Mark x-walk at Stop - Option4- over 2k 3way and 4way stops
Mark x-walk at Stop - Option3 -within 1/4 mile
Mark x-walk at Stop - Option1-crashes and street class
FREMONT AV
ABERDEEN DR
ALLISON WY
MARY AV
HELENA DR
THE DALLES AV
BERNARDO AV
BEDFORD AV
ASTORIA DR
CELILO DR
CHEHALIS DR
CHELAN DR
COEUR D ALENE WY
CORVALLIS DR
KENNEWICK DR
LOUISE DR
PENDLETON AV
POCATELLO AV
N
PARAGON

Safe Routes to School
West Valley Elementary

(Cupertino Union School District)



SANTA CLARA UNIFIED SCHOOL DISTRICT

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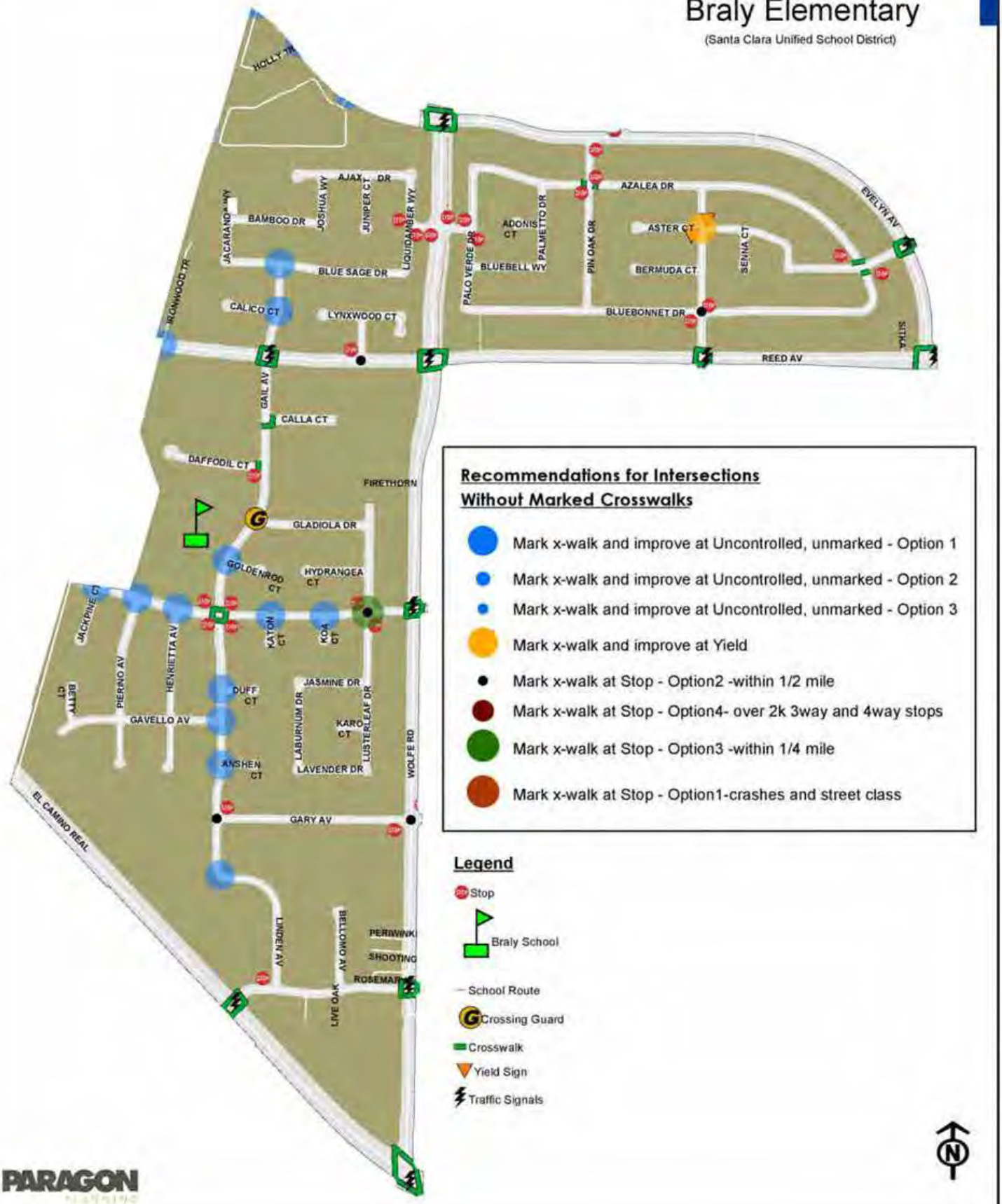
Safe Routes to School
Braly Elementary

(Santa Clara Unified School District)



Recommendations for Intersections Without Marked Crosswalks

- Mark x-walk and improve at Uncontrolled, unmarked - Option 1
- Mark x-walk and improve at Uncontrolled, unmarked - Option 2
- Mark x-walk and improve at Uncontrolled, unmarked - Option 3
- Mark x-walk and improve at Yield
- Mark x-walk at Stop - Option2 -within 1/2 mile
- Mark x-walk at Stop - Option4- over 2k 3way and 4way stops
- Mark x-walk at Stop - Option3 -within 1/4 mile
- Mark x-walk at Stop - Option1-crashes and street class

Legend

- Stop
- Braly School
- School Route
- Crossing Guard
- Crosswalk
- Yield Sign
- Traffic Signals

PARAGON

Safe Routes to School
Braly Elementary

(Santa Clara Unified School District)

Recommendations for Intersections With Marked Crosswalks

- Stop Warrant and improve at Marked x-walks -Option2
- Stop Warrant and improve at Marked x-walks -Option1
- Rectangular Rapid Flashing Beacons
- In-Pavement Lighted X-Walks
- Raised Crosswalks/Traffic Calming
- Improve Signal - Option1- Within 1/2 mile with high crash rate
- Improve Signal - Option2- Within 1/2 mile

Legend

- Stop
- Braly School
- School Route
- Crossing Guard
- Crosswalk
- Yield Sign
- Traffic Signals

PARAGON

Safe Routes to School
Ponderosa Elementary

(Santa Clara Unified School District)

Base Map

- Ponderosa School
- Attendance Boundary
- School Route
- Crossing Guard
- Crosswalk
- Stop Sign
- Yield Sign
- Traffic Signals

Recommendations for Intersections Without Marked Crosswalks

- Mark x-walk and improve at Uncontrolled, unmarked - Option 1
- Mark x-walk and improve at Uncontrolled, unmarked - Option 2
- Mark x-walk and improve at Uncontrolled, unmarked - Option 3
- Mark x-walk and improve at Yield
- Mark x-walk at Stop - Option2 -within 1/2 mile
- Mark x-walk at Stop - Option4- over 2k 3way and 4way stops
- Mark x-walk at Stop - Option3 -within 1/4 mile
- Mark x-walk at Stop - Option1-crashes and street class

PARAGON

Safe Routes to School
Ponderosa Elementary

(Santa Clara Unified School District)

Base Map

- Ponderosa School
- Attendance Boundary
- School Route
- Crossing Guard
- Crosswalk
- Stop Sign
- Yield Sign
- Traffic Signals

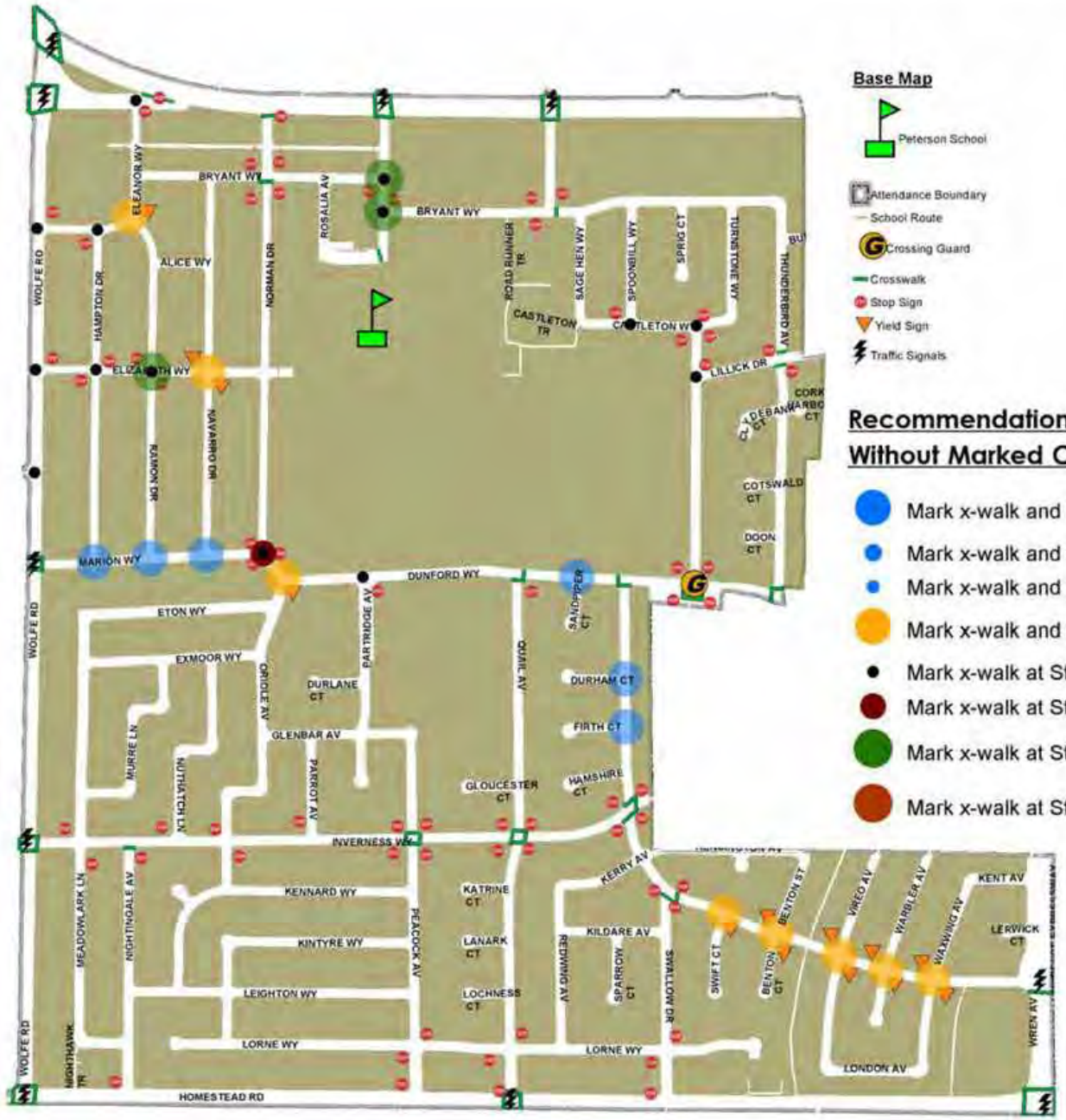
Recommendations for Intersections With Marked Crosswalks

- Stop Warrant and improve at Marked x-walks -Option2
- Stop Warrant and improve at Marked x-walks -Option1
- Rectangular Rapid Flashing Beacons
- In-Pavement Lighted X-Walks
- Raised Crosswalks/Traffic Calming
- Improve Signal - Option1- Within 1/2 mile with high crash rate
- Improve Signal - Option2- Within 1/2 mile

PARAGON

Safe Routes to School
Peterson Middle School

(Santa Clara Unified School District)



Base Map

- Peterson School
- Attendance Boundary
- School Route
- Crossing Guard
- Crosswalk
- Stop Sign
- Yield Sign
- Traffic Signals

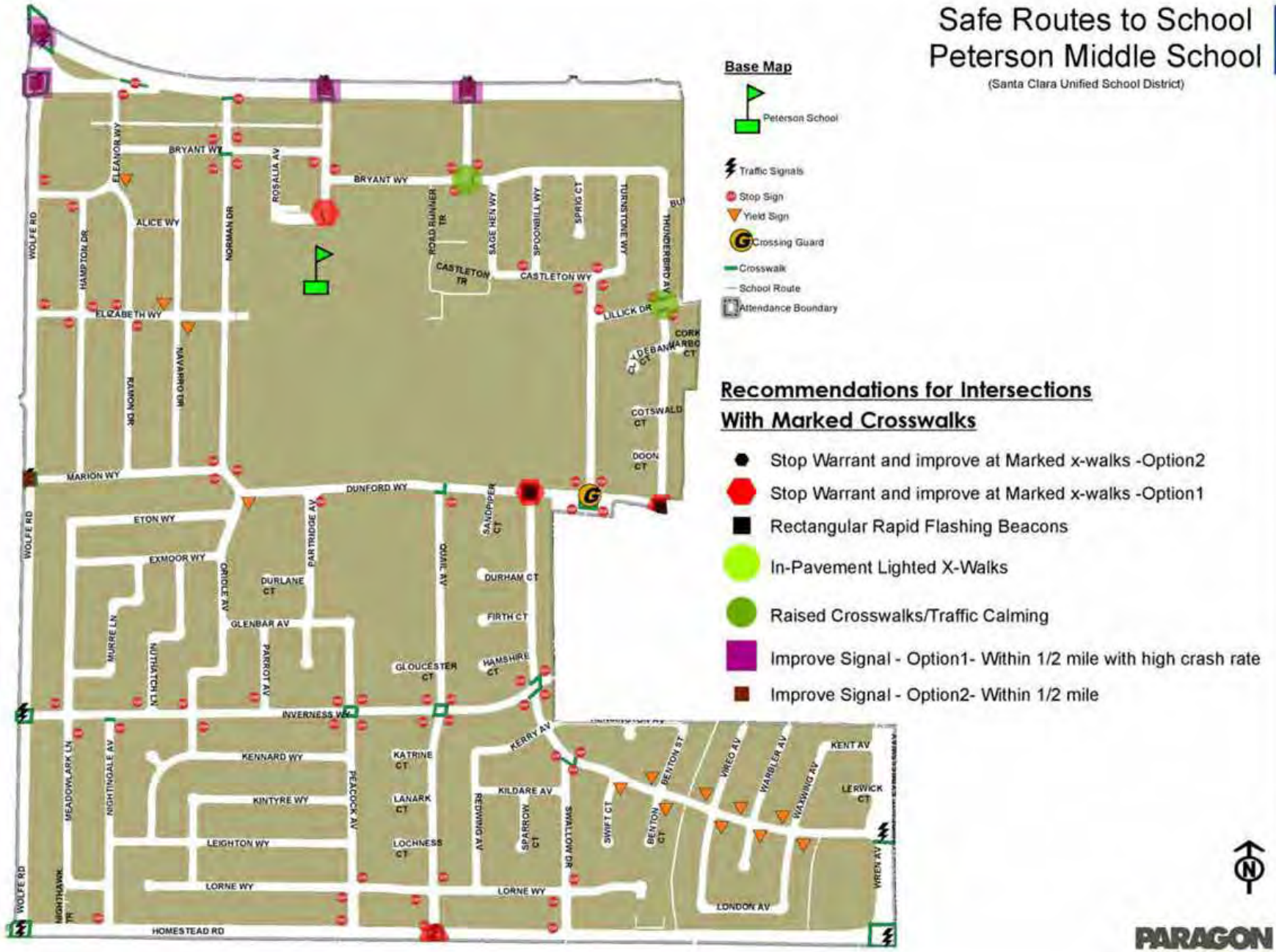
Recommendations for Intersections Without Marked Crosswalks

- Mark x-walk and improve at Uncontrolled, unmarked - Option 1
- Mark x-walk and improve at Uncontrolled, unmarked - Option 2
- Mark x-walk and improve at Uncontrolled, unmarked - Option 3
- Mark x-walk and improve at Yield
- Mark x-walk at Stop - Option2 -within 1/2 mile
- Mark x-walk at Stop - Option4- over 2k 3way and 4way stops
- Mark x-walk at Stop - Option3 -within 1/4 mile
- Mark x-walk at Stop - Option1-crashes and street class

PARAGON PLANNING

Safe Routes to School
Peterson Middle School

(Santa Clara Unified School District)



Attachment D
Examples of School Traffic Control Improvements

Pedestrian Flashing Sign

Crosswalk Refuge

In-Pavement Roadway Warning Lights

Marked School Crosswalk

Raised Crosswalk

High Visibility Ladder Crosswalk

ATTACHMENT E

DRAFT

SUNNYVALE BICYCLE AND PEDESTRIAN ADVISORY COMMISSION
Meeting Minutes – November 15, 2012

The Sunnyvale Bicycle and Pedestrian Advisory Commission met at 6:31 p.m. on November 15, 2012 with Commission Chair James Manitakos presiding. The meeting was held in the West Conference Room, City Hall, 456 West Olive Avenue, Sunnyvale.

ROLL CALL/CONSIDERATION OF ABSENCES

Members Present: James Manitakos
Angela Rausch
Kevin Jackson
Richard Kolber
David Jones
Cathy Switzer
Kyle Welch

Members Absent: None

Council Liaison Present: Mayor Anthony Spitaleri

Staff Present: Jack Witthaus, Transportation and Traffic Division Manager, Department of Public Works

Visitors: David Simons, Valley Transportation Authority Bicycle and Pedestrian Advisory Committee representative

SPECIAL PRESENTATION

David Simons gave a summary of Valley Transportation Authority (VTA) BPAC events, including election of officers, pending review of One Bay Area Grant applications, and a pending workshop on comments on revisions to the VTA Bicycle Technical Guidelines. The Commission inquired about One Bay Area grant funding.

PUBLIC ANNOUNCEMENTS

(Speakers are limited to 3 minutes for announcements of related board/commission events, programs, resignations, recognitions, acknowledgments)

Commissioner Jackson announced the passing of Ellen Fletcher, a noted bicycle advocate. He gave updates on a Sunnyvale Cool Cities parking presentation, a Stevens Creek Trail public meeting, a Lawrence Station Area Plan citizens group meeting, and Safe Routes to School program activities. He commented on the importance of bicycles in the wake of the east coast Superstorm.

CONSENT CALENDAR

1.A) Approval of the Draft Minutes of October 18, 2012 Meeting
1.B) Updated 2012 BPAC Calendar

Chair Manitakos pulled item 1A, Approval of the Draft Minutes of October 18, 2012.

Item 1B was approved by consensus.

1.A) Approval of the Draft Minutes of October 18, 2012 Meeting

Chair Manitakos asked that the October minutes specifically reflect under item 1, Bicycle Parking for Non-Residential Uses, the BPAC's support for a ratio of 5% bicycle parking to vehicle parking. He also requested under Information Only items that the minutes reflect that the BPAC supports language in City driver training materials to state that bicycles and pedestrians are a "priority", not a "concern."

The minutes were approved as amended by consensus.

PUBLIC COMMENTS

This category is limited to 15 minutes, with a maximum of three minutes per speaker. If you wish to address the board or commission, please complete a speaker card and give it to the Recording Secretary or you may orally make a request to speak. If your subject is not on the agenda, you will be recognized at this time; but the Brown Act (Open Meeting Law) does not allow action by board or commission members. If you wish to speak to a subject listed on the agenda, you will be recognized at the time the item is being considered by the board or commission.

None.

PUBLIC HEARINGS/GENERAL BUSINESS

1. ACTION – Ranking of Study Issues

Chair Manitakos announced that the BPAC would follow the Study Issues ranking procedures provided by the Office of the City Manager.

Chair Manitakos inquired whether the current Stevens Creek Trail Joint Cities Feasibility Study would be considering property issues.

Motion by Jackson, second Manitakos, to drop issue CDD 13-01, Appropriate Locations for Bicycle Parking. Commisioner Jackson stated that he believed that the issue has the wrong emphasis, and that legitimate bicycle parking should be provided at locations where people are parking illegitimately, rather than regulating bike parking. Commissioner Jones noted that bicycle parking had been addressed well in the recent non-residential bicycle parking study. Motion approved, 7-0.

Motion by Jackson to drop issue ESD 13-04 regarding Transportation Demand Management (TDM) program enforcement. Commissioner Jackson stated that the level of effort was too great and was not justified based on his perceptions of compliance with

TDM requirements. Second by Manitakos. Friendly amendment by Kolber to defer the issue, not accepted by the maker. Commissioner Jones noted that the City Council had expressed concerns recently about questionable implementation and boilerplating of TDM programs. In response to an inquiry by Commisioner Kolber, staff stated that there are insufficient resources currently to conduct robust TDM program enforcement. Motion approved 6-1, Welch dissenting, stating he preferred deferral of the issue.

Motion by Manitakos to drop issue DPW 13-09 regarding resources for demarcating no parking zones at controlled intersections. He stated that Council has already acted to direct staff to conduct this work. Commissioner Jackson stated that he believes there are no resources to do this work. Staff clarified that there are resources, but it will take some time to accomplish the work. In response to an inquiry from Commissioner Jackson, staff stated that they are considering a budget issue to add resources to allow painting of red curbs as a means to implement the Council approved parking restrictions. Commissioner Switzer inquired if the parking restrictions would occur if neither a study issue or a budget issue were approved, and staff responded affirmatively. Commissioner Jackson asked if the BPAC could be given progress reports. Motion seconded by Jackson, motion approved 7-0.

Commisioner Kolber inquired about what a Cyclovia is.

Motion by Jones to drop issue DPW 13-07 regarding removal of bollards based on staff support for accomplishing this as an operational issue. Second Manitakos. Commissioner Jackson stated that he was not confident that progress would be made on this issue. In response to an inquiry from Chair Manitakos, staff indicated that work is proceeding on modification of two locations to remove bollards. Commissioner Jackson stated that the pedestrian overpass near Fair Oaks and Highway 101 should be a priority. Motion approved 5-2, Jackson and Kolber dissenting based on a desire for prioritization and scheduling of removal.

Motion by Manitakos to defer item DPW 13-12 regarding acquisition of property along Stevens Creek until the Stevens Creek Trail Joint Cities Feasibility Study is complete. Second Jackson. Motion approved, 7-0.

Motion by Jackson, second Manitakos, to defer the Cyclovia study issue due to a clear lack of resources to hold an event. Commissioner Switzer suggested contacting local cycling clubs to see if they would pursue an event. Motion approved, 7-0.

Motion by Jackson to defer the bicycle and pedestrian level of service study issue. Commissioner Jackson stated that it is not a practical role for a City to take the lead in adopting this type of measure. The Commission and staff discussed the status of various efforts to consider bicycle and pedestrian level of service, including efforts by the VTA. Second my Manitakos based on the VTA's ongoing consideration of bicycle and pedestrian level of service. Motion approved, 7-0.

Motion by Jackson to defer the bicycle boulevard pilot project study issue, based on his concerns that Sunnyvale would not implement an effective bicycle boulevard and that bicycle boulevards still require bicycles to ride side by side with motor vehicles without any

dedicated bike space. Commissioner Jones encouraged staff to refine the definition of bicycle boulevards. Motion failed, 2-5, Manitakos, Rausch, Switzer, Kolber, and Welch opposed.

Discussion of study issues for ranking occurred. Commissioner Jackson indicated support for issue DPW 13-06 regarding residential area parking measures to support bicycling. Commissioner Jones related that there was City Council support for DPW 13-01, the pedestrian anti-harassment ordinance.

The Commission ranked study issues as follows:

ISSUE	Switzer	Rausch	Manitakos	Jackson	Welch	Jones	Kolber	Total
DPW 13-04, vision triangle extension	1	3	3	3	5	3	4	22
DPW 13-06, residential parking measures	2	2	6	1	1	1	2	15
DPW 13-08, bikes use full lane signs	3	4	2	2	7	7	7	32
DPW 13-10, bike boulevard pilot	5	1	1	6	2	4	3	22
DPW 13-01, pedestrian anti-harassment	4	7	7	7	4	2	1	32
DPW 13-05 street amenities for disabled	6	6	5	5	2	3	6	33
DPW 13-02 broken yellow lines	7	5	4	4	6	6	5	37

Motion by Kolber, second Manitakos, to recommend the top five scoring issues to the City Council, and to defer the remaining two issues to the next year. Motion approved, 7-0.

2. ACTION - STUDY ISSUE – Consideration and Recommendation to Council on a Comprehensive School Traffic Study

Staff indicated that they could answer questions. In response to an inquiry from Commissioner Jackson, staff responded that the study had not been shared with school administrators. Commissioner Jackson encouraged staff to share the study with schools. Commissioner Jackson inquired about the Traffic Safe Communities Network effort. He requested editorial changes to the Report to Council to clarify that lower speeds can reduce the incidence of collisions as well, by increasing reaction times. He asked about the process for Council to approve speed limit changes. Commissioner Welch inquired about private schools. Commissioner Jones asked about the focus of the study on traffic controls and GIS formatting. Motion by Manitakos, second Kolber to recommend approval of the staff recommendation. Motion approved, 7-0.

NON-AGENDA ITEMS AND COMMENTS

- COMMISSIONERS ORAL COMMENTS

Chair Manitakos requested numbering of the meeting packet pages. He encouraged staff to prepare agendas as far ahead of time as possible.

The Commission discussed possible agenda items for the December 20 meeting.

- STAFF ORAL COMMENTS

None.

INFORMATION ONLY ITEMS

1. BPAC E-mail messages and/or letters since circulation of the agenda packet of the October 18, 2012 meeting.
2. BPAC Active Items List.

Commissioner Jackson inquired about the status of Bernardo Avenue Caltrain undercrossing planning.

ADJOURNMENT

Meeting adjourned at 8:45 p.m.

Respectfully submitted by:

_____

Jack Witthaus
Transportation and Traffic Manager