



SPLANADE CORRIDOR STUDY

Workshop #3

City Council Meeting

April 5, 2016



ESPLANADE CORRIDOR TIMELINE

Esplanade Timeline

- 1849 John Bidwell purchases "Rancho del Arroyo Chico."
- 1860 The City of Chico founded by John Bidwell.
- 1870 Arrival of the California and Oregon Railroad.
- 1872 City of Chico became incorporated.
- 1887 Establishment of the State Normal School, which later became California State University, Chico.
- 1898 **John Bidwell planted six rows of trees creating the public travel lanes for buggies, wagons, bicycles, and pedestrians.**
- 1904 **Northern Electric Railway (NERV) runs rail service along the east side of the Esplanade.**
- 1913 Dr. Newton Thomas Enloe opened the original Enloe Hospital on Hume Street in Chico.
- 1918 NERV goes out of business and reorganized as the Sacramento Northern Railroad (SNRR).
- 1920 **The Esplanade was still unpaved and was designated as US Highway 99E.**
- 1937 Dr. Enloe purchases parcel of land at 1531 The Esplanade where the hospital moved and still stands.
- 1947 SNRR ends passenger streetcar service.
- Late 1950s **Fred Davis and Earl Talken redesign The Esplanade, reconfigured from a two lane street bordered by side-streets, to a multiple-roadway boulevard.**
- 1960s **The center two rows of trees were removed, the center roadway was widened, and traffic signals were installed and timed at 28 miles per hour.**
- 1965 **The Highway 99E freeway was completed. Traffic volumes on the Esplanade decrease.**
- Mid 1970s **The railroad tracks, which ran along the Esplanade, through downtown and along Park Avenue, were removed.**
- 1980 Enloe Hospital four-story addition was built with the main entrance moved to Magrolia Avenue.
- 1995 **The Esplanade was repaved with right-turn lanes installed where the rail bed had once been.**
- 2002 **The Esplanade was featured along with other great Boulevards from around the world in 'The Boulevard Book: History, Evolution, Design of Multiway Boulevards' by Allan B. Jacobs, Professor emeritus from the University of California, Berkeley.**
- 2005 **Octavia Boulevard which stands on the right-of-way of the former Central Freeway, was completed in San Francisco and was modeled using the design of The Esplanade.**
- 2007-2010 The Enloe Hospital is expanded including a new expanded emergency department and a 742-space parking structure.
- 2015 **The Esplanade Corridor Improvement Study is initiated to identify strategies to improve the safety and operations of vehicles, bicycles, pedestrians, and transit along the corridor between Memorial Way and 11th Avenue.**



1898



1910



1920



1940



1947



1950



1960



1995



2002



2005



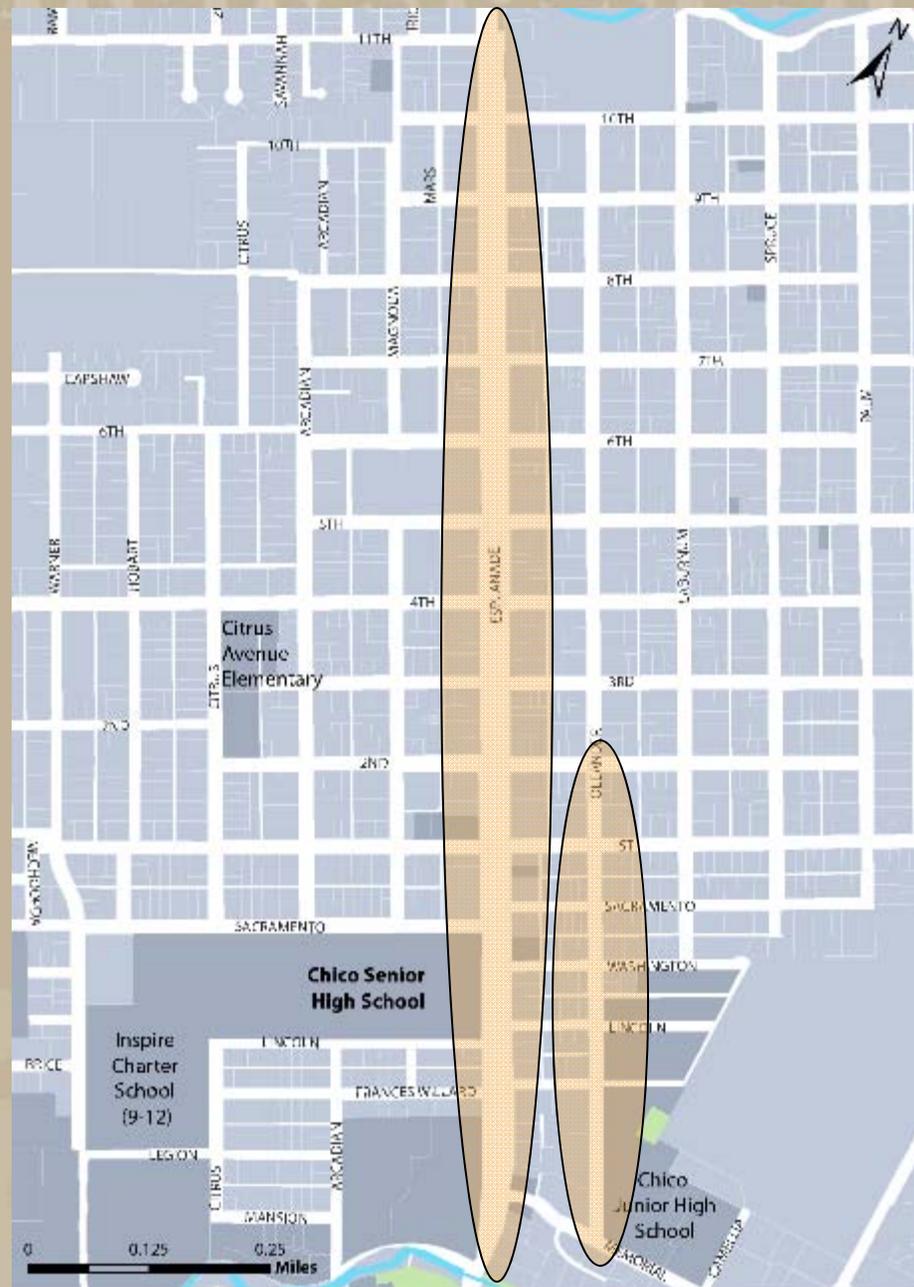
2015



Existing Deficiencies



ESPLANADE CORRIDOR IMPROVEMENT STUDY



STAFF REPORT ATTACHMENT B

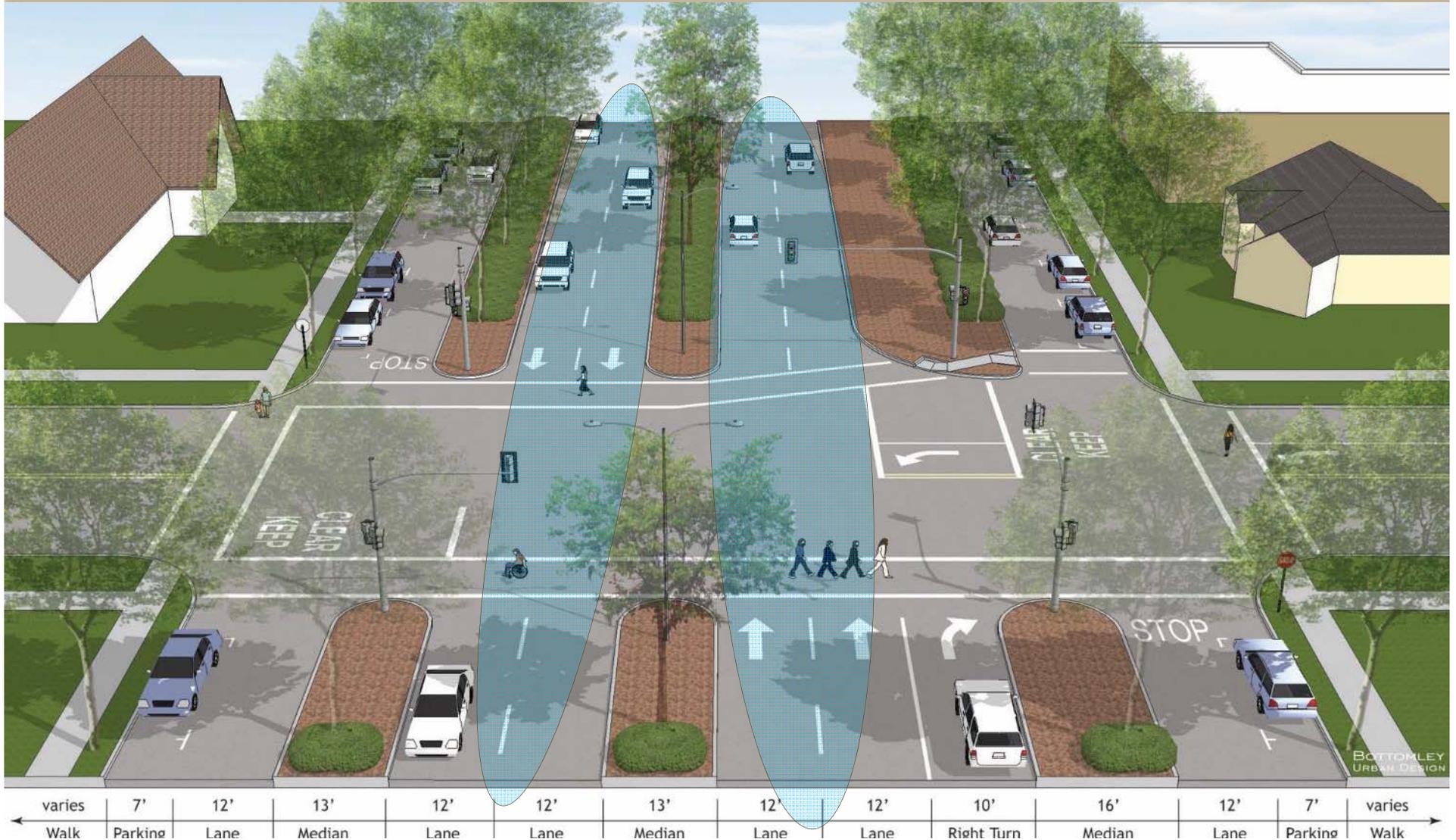
Street Cross Section – Signalized Intersection



| | | | | | | | | | | | | | |
|----------|---------|------|--------|------|------|--------|------|------|------------|--------|------|---------|----------|
| ← varies | 7' | 12' | 13' | 12' | 12' | 13' | 12' | 12' | 10' | 16' | 12' | 7' | varies → |
| Walk | Parking | Lane | Median | Lane | Lane | Median | Lane | Lane | Right Turn | Median | Lane | Parking | Walk |

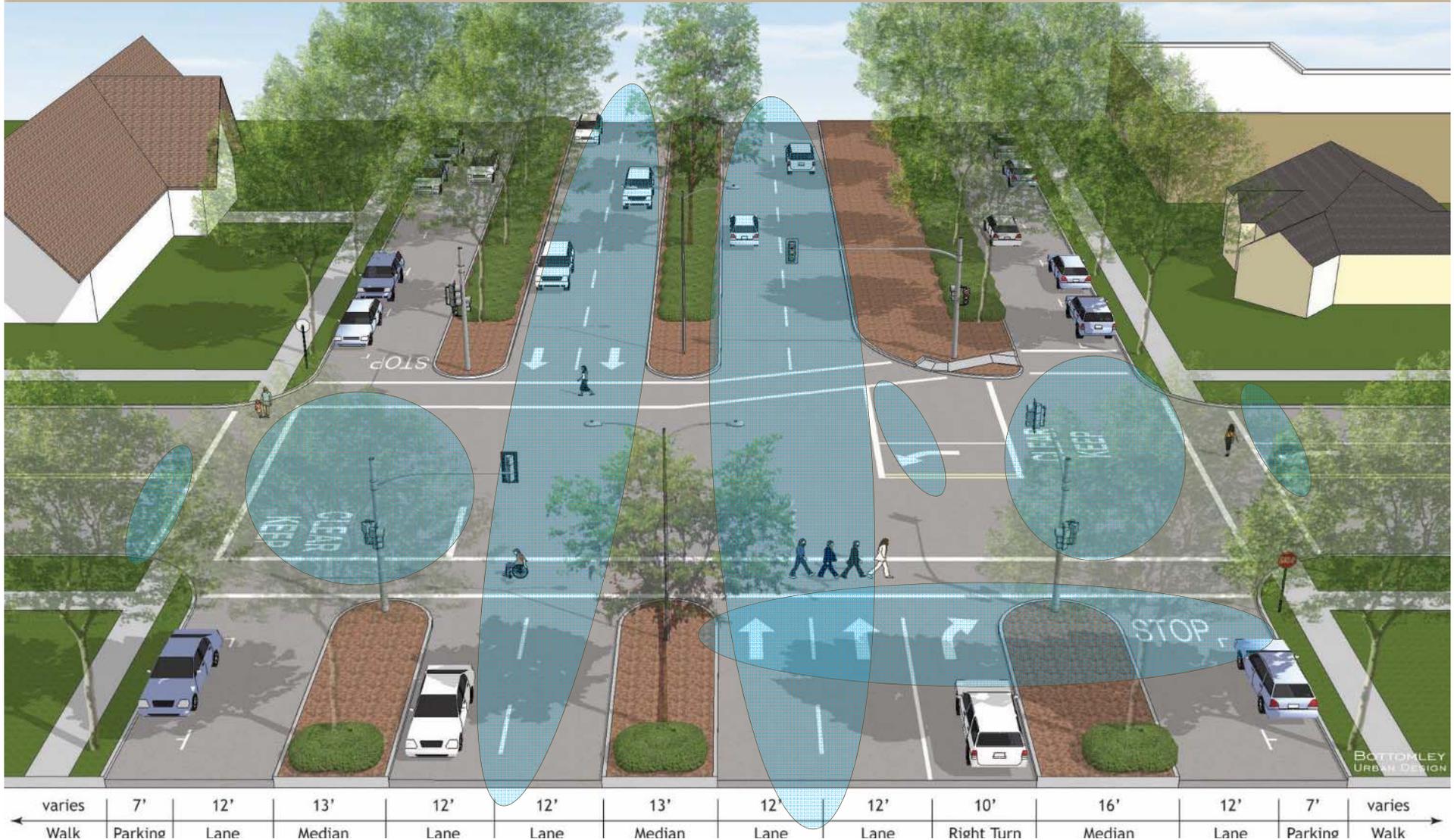
ESPLANADE CORRIDOR IMPROVEMENT STUDY

Street Cross Section – Signalized Intersection



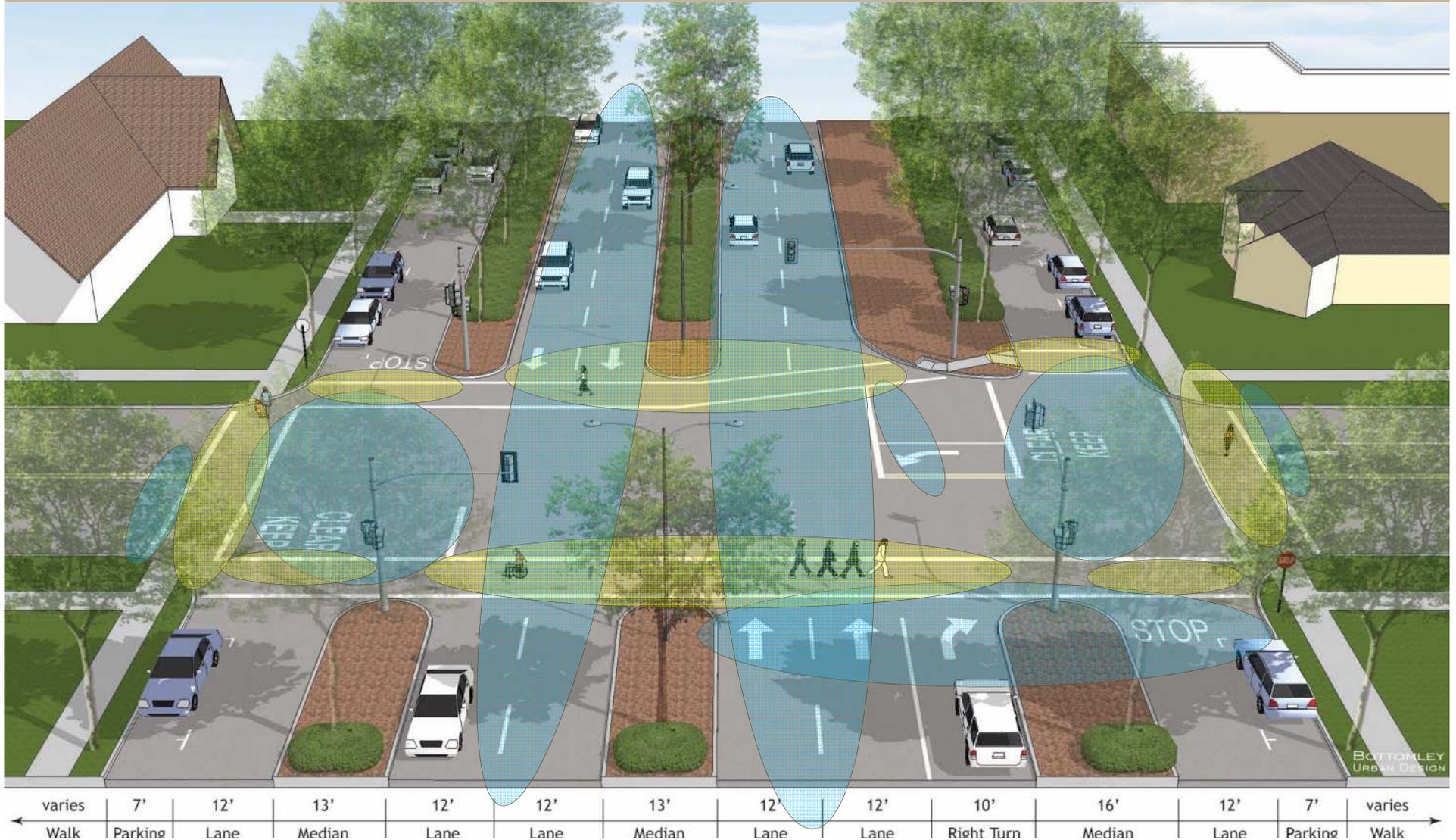
ESPLANADE CORRIDOR IMPROVEMENT STUDY

Street Cross Section – Signalized Intersection



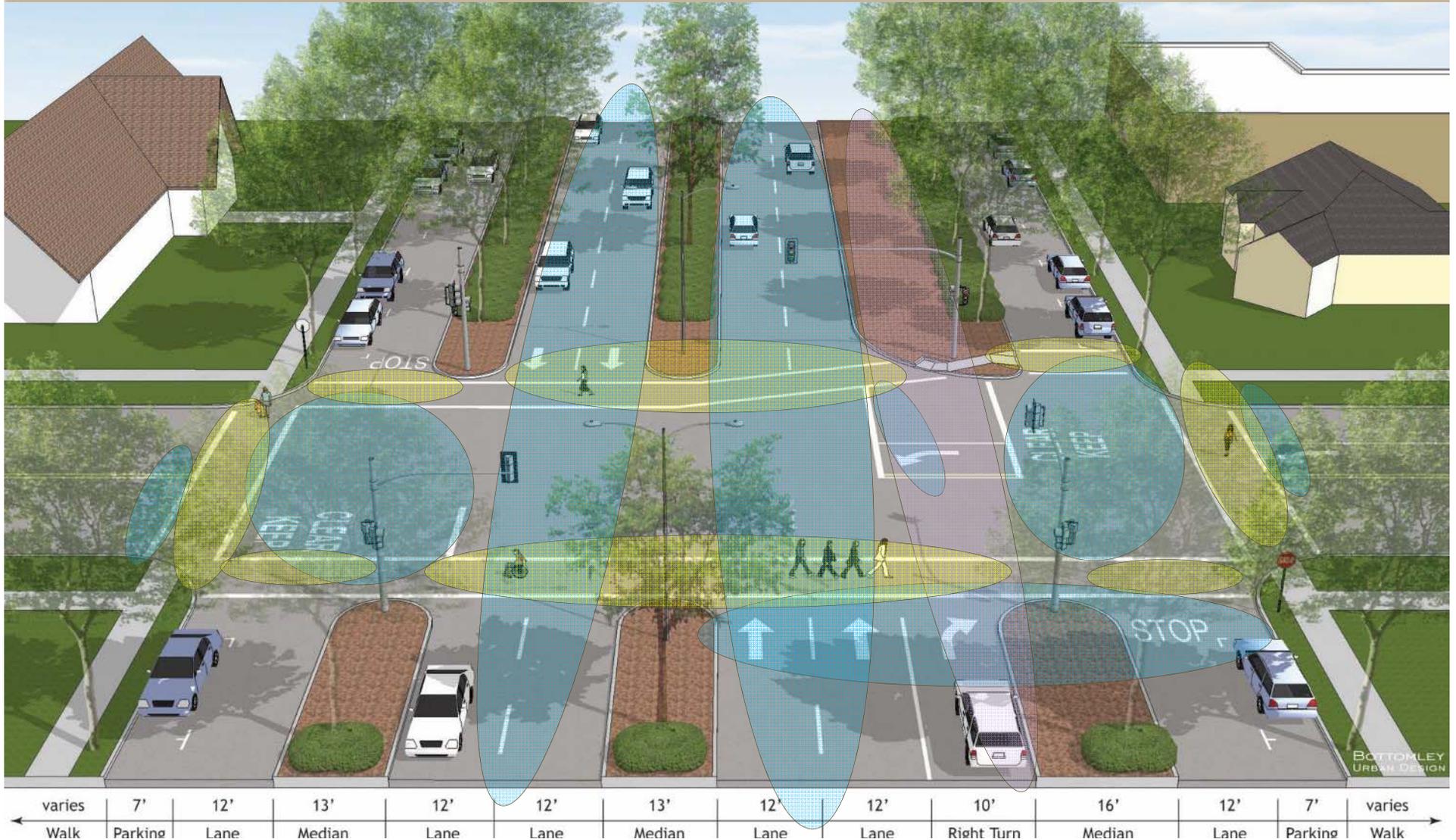
ESPLANADE CORRIDOR IMPROVEMENT STUDY

Street Cross Section – Signalized Intersection



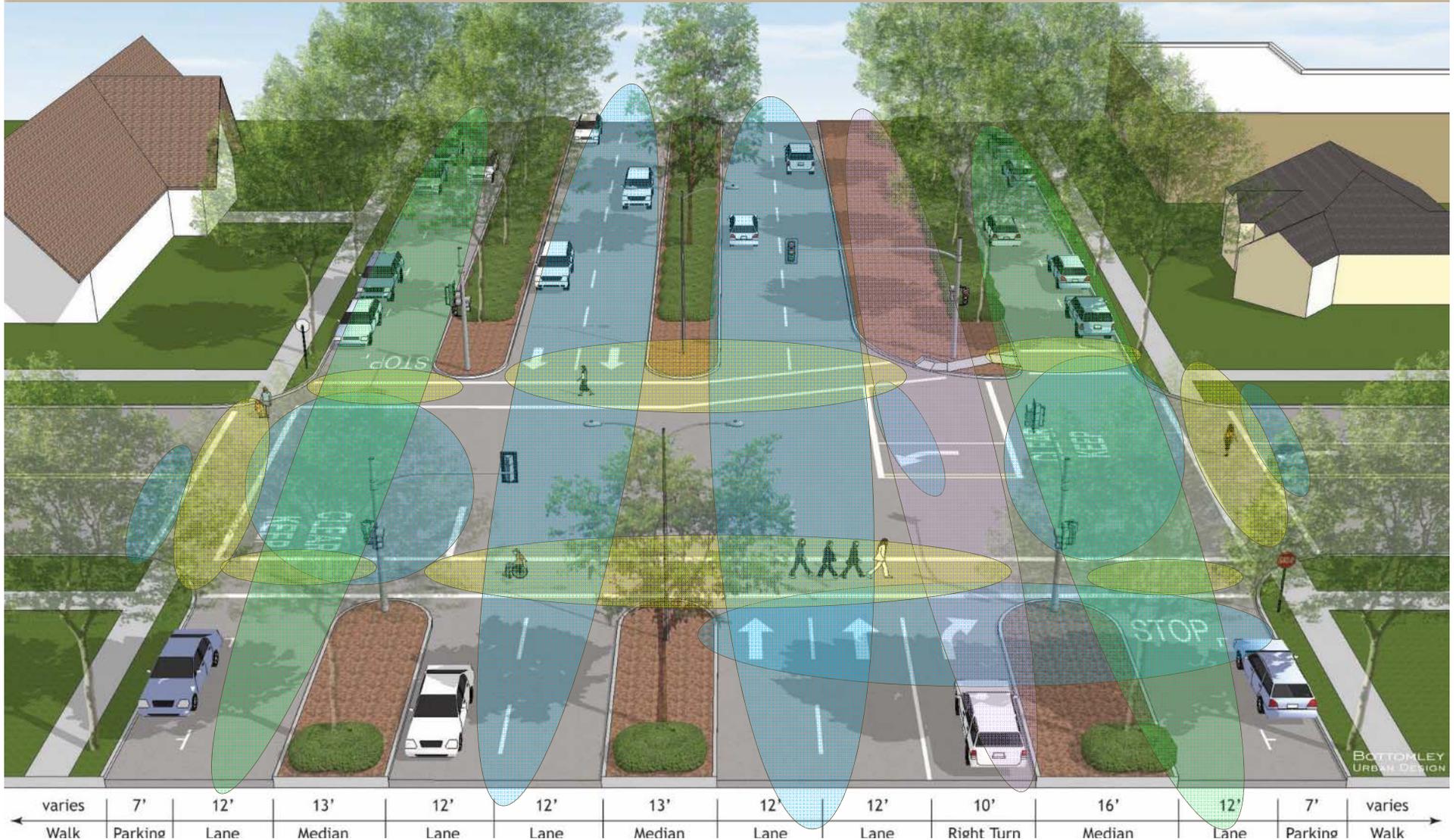
ESPLANADE CORRIDOR IMPROVEMENT STUDY

Street Cross Section – Signalized Intersection



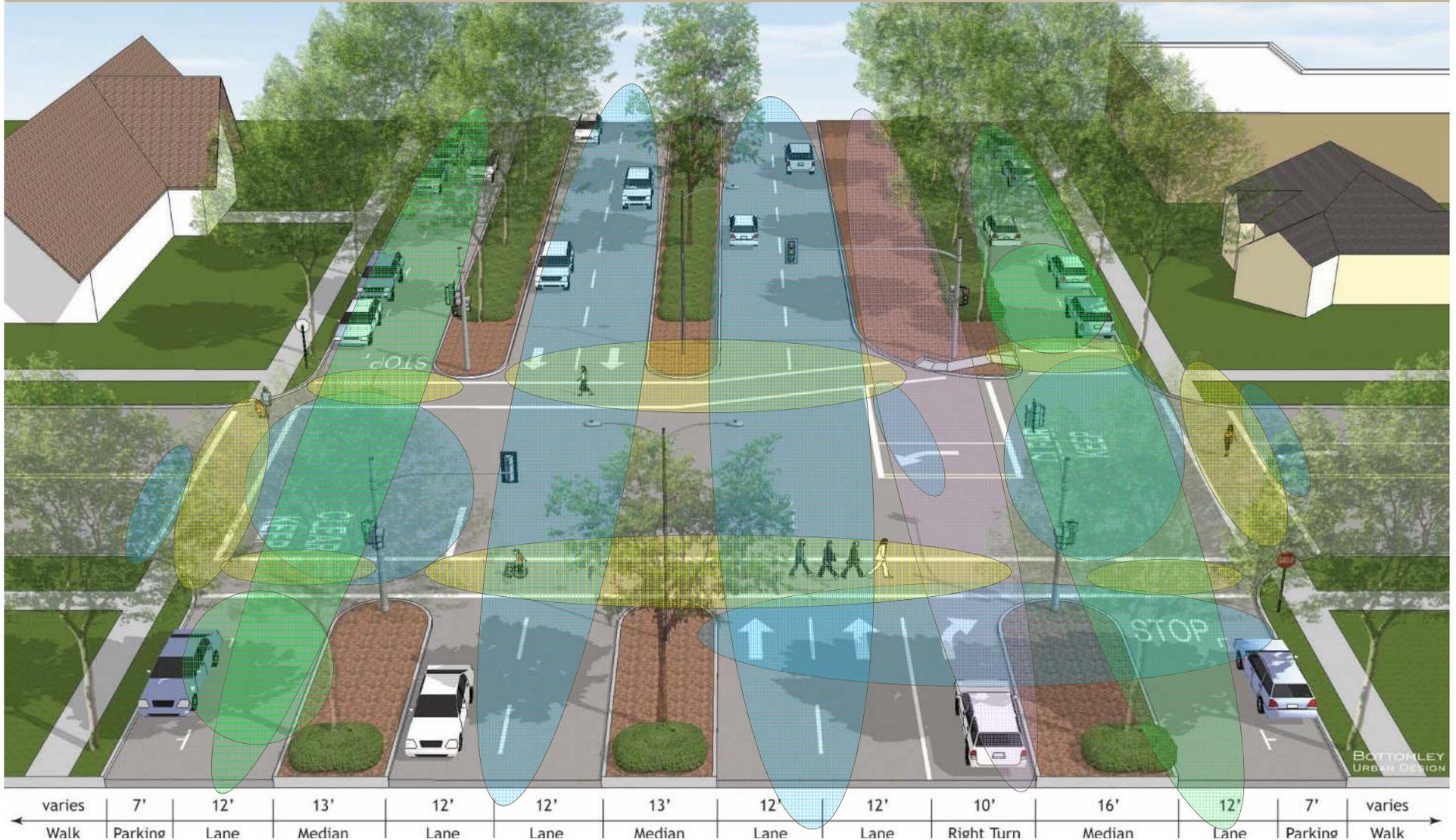
ESPLANADE CORRIDOR IMPROVEMENT STUDY

Street Cross Section – Signalized Intersection



ESPLANADE CORRIDOR IMPROVEMENT STUDY

Street Cross Section – Signalized Intersection



STAFF REPORT ATTACHMENT B

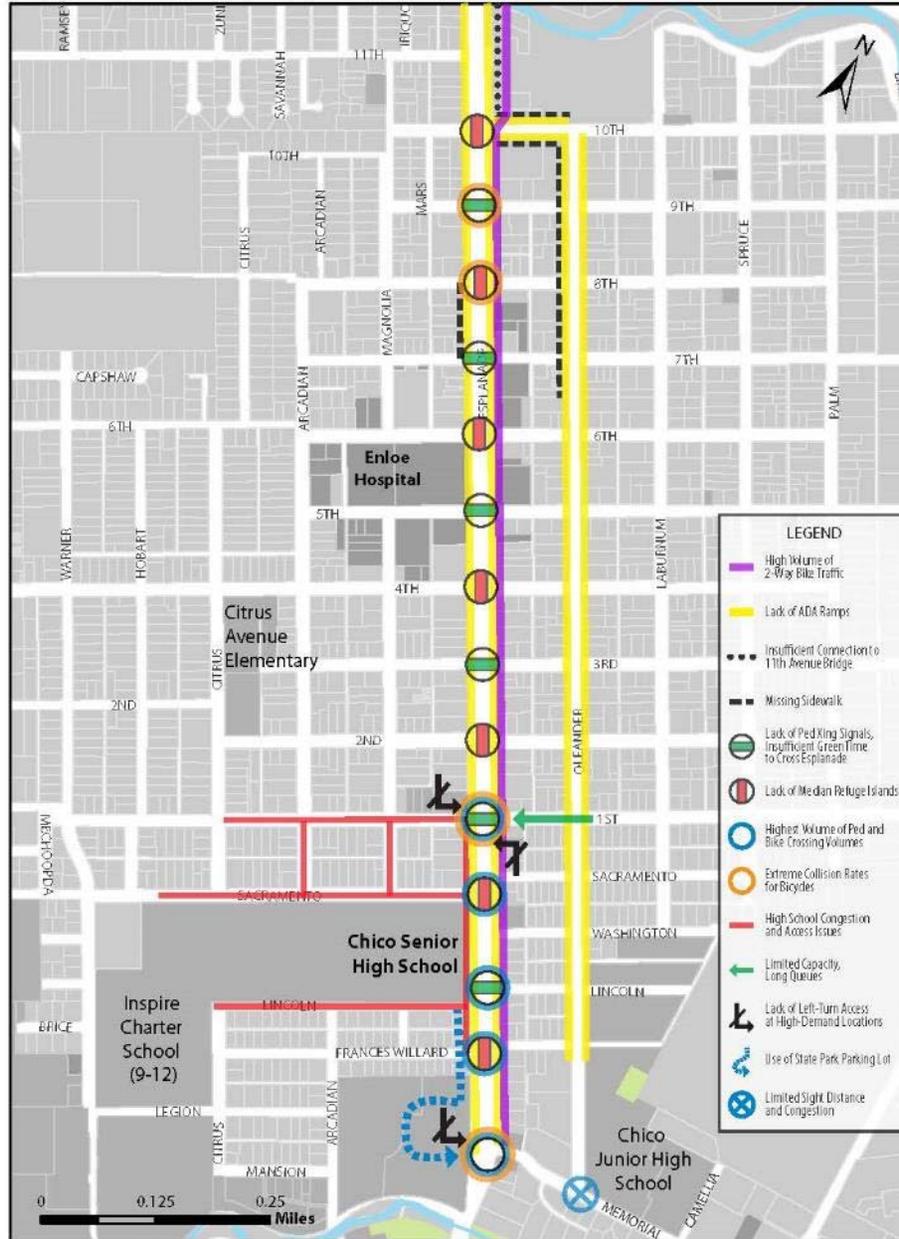
Street Cross Section – Unsignalized Intersection



| | | | | | | | | | | | | | | |
|----------|---------|------|--------|------|------|----|-----------|------|------|--------|------|---------|--------|---|
| ← varies | 7' | 12' | 13' | 12' | 12' | 3' | 10' | 12' | 12' | 28' | 12' | 7' | varies | → |
| Walk | Parking | Lane | Median | Lane | Lane | | Left Turn | Lane | Lane | Median | Lane | Parking | Walk | |

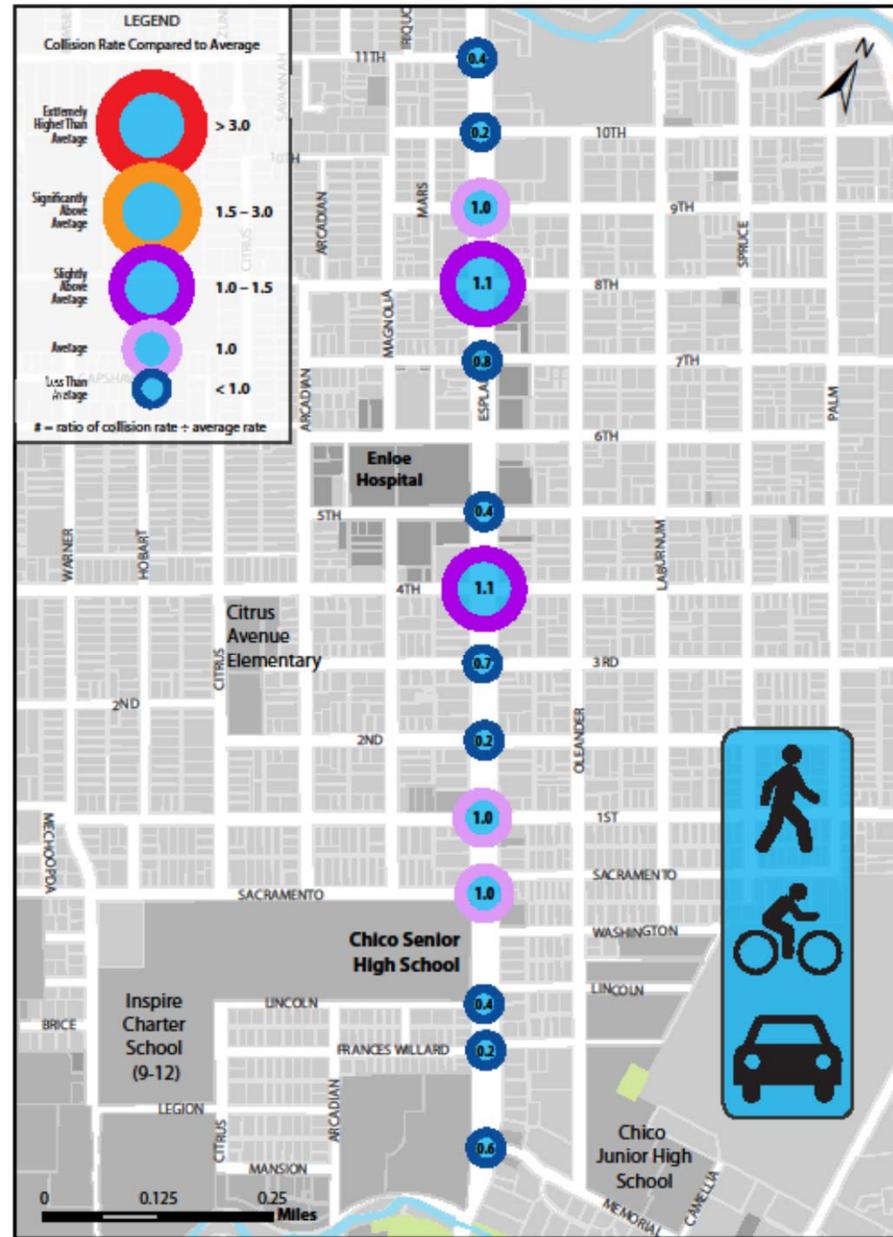
BOTTOMLEY
URBAN DESIGN

STAFF REPORT ATTACHMENT C



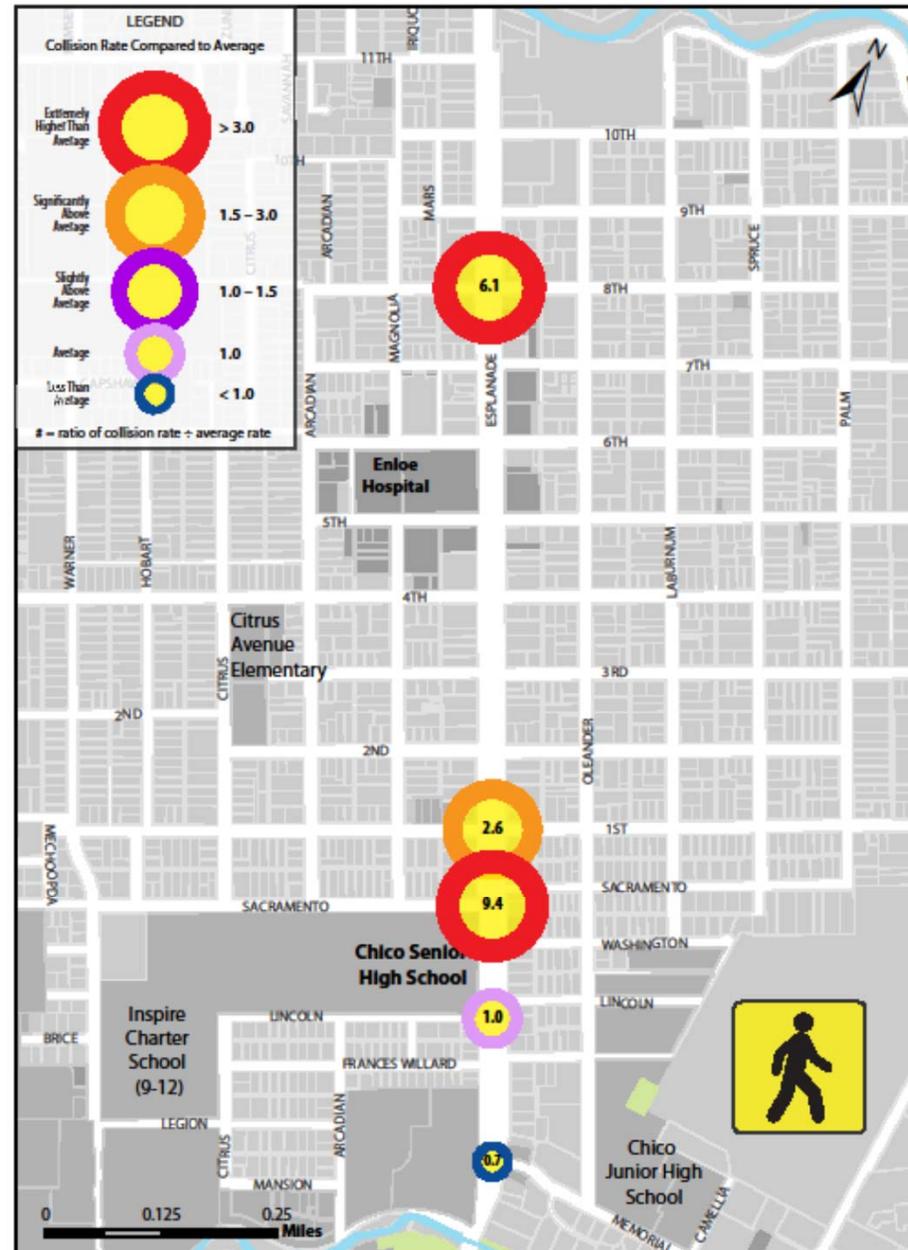
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STAFF REPORT ATTACHMENT D



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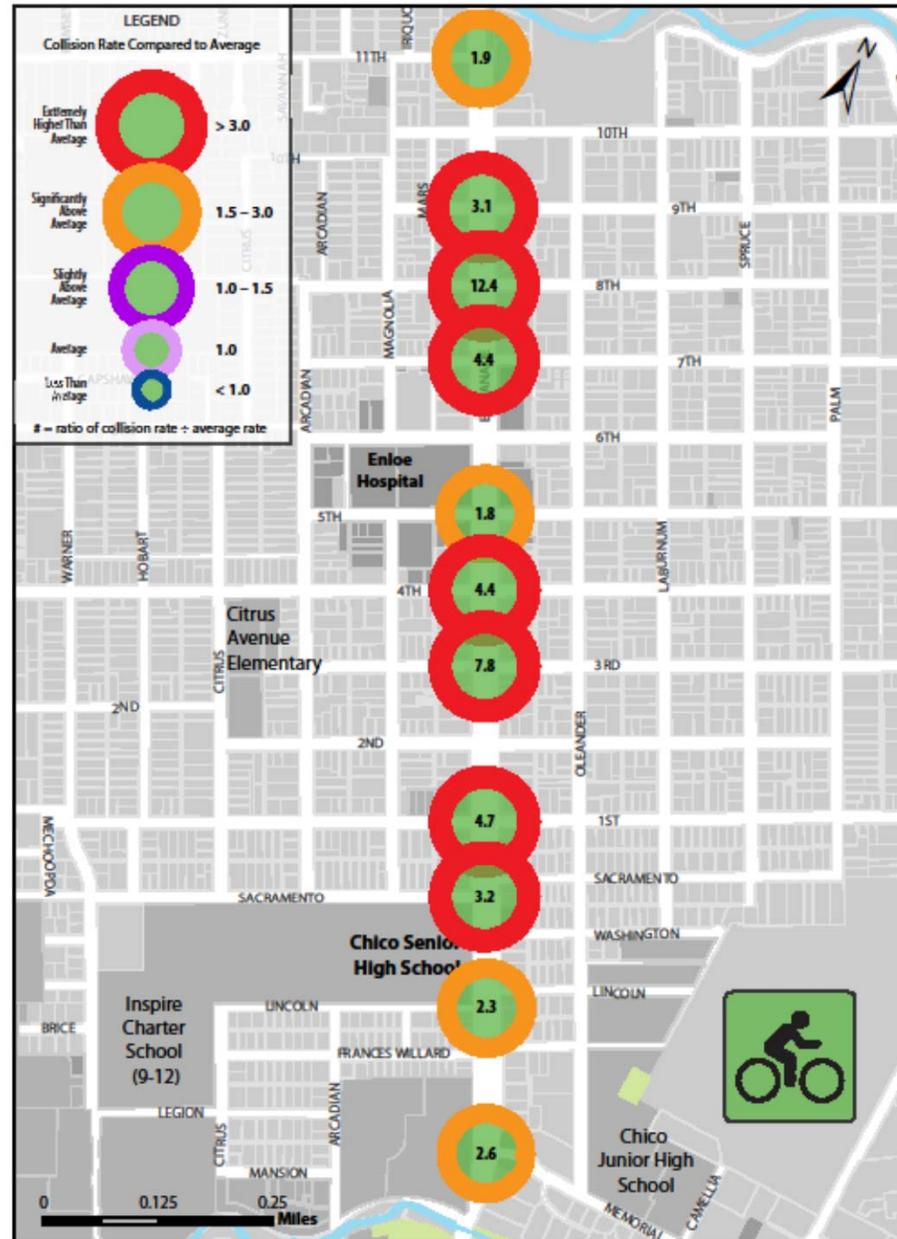
STAFF REPORT ATTACHMENT D



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STAFF REPORT ATTACHMENT D



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- Vehicle Collision rate is very close to the expected rate for similar facilities.



- Better than expected pedestrian safety record even without adequate crossing timing.
Pedestrian Collision hot spot at Esplanade/Sacramento Avenue.



- Approximately 5 times more likely to be in an accident if you are a bicyclist than if you are travelling in a vehicle.



Trips vs. Collisions

| Mode | Daily Trip Volume | | Collisions per Year | |
|------------|-------------------|-------------|---------------------|--------------|
| | Trips | % | Collisions | % |
| Vehicle | 21,343 | 94.3% | 16 | 81.6% |
| Bicycle | 812 | 3.6% | 3 | 15.3% |
| Pedestrian | 477 | 2.1% | 0.6 | 3.1% |
| Total | 22,632 | 100.0% | 20 | 100% |



Pedestrian Safety Concerns

- Existing **traffic signals along corridor do not meet regulations** in accordance with the Manual for Uniform Traffic Control Devices (MUTCD) for amount of time provided for pedestrians to cross the roadway. This is a significant safety issue that creates additional liability for the City.
- **High volume of pedestrian crossings near the High School** and moderate volume near the hospital.
- **Absence of pedestrian crossing signals** at signalized intersections.
- Highest concentration of reported accidents involving pedestrians near the High School.
- Absence of refuge medians at unsignalized intersections.
- Confusion as to vehicle-pedestrian right-of-way at intersections of E-W streets with frontage roads.



ADA Accessibility Issues

- **2006 FHWA letter** recommending an update to ADA Transition Plan in accordance with Federal Regulations as outlined in 28 CFR Part 353.150.(d).
- The 2006 FHWA letter **outlines Accessible pedestrian signal controls**, referencing Section 4E.06 of the MUTCD that states if ‘a particular signalized intersection presents difficulties for pedestrians who have visual disabilities to cross safely and effectively, an engineering study should be conducted that considers the safety and effectiveness for pedestrians in general, as well as the information needs of pedestrians with visual disabilities.’
- **Lack of ADA accessible ramps and routes.**
- Missing sidewalk sections on the Esplanade, on the west side between 7th Avenue and 8th Avenue, as well as along the west side of Oleander from 10th Avenue to 7th Avenue.
- Insufficient ramp and sidewalk connections to the 11th Street trail bridge.
- Sidewalk surface inconsistencies.



Lack of Bicycle Facilities and Safety Concerns

- Relatively **high volume of bicycle use on the Esplanade** frontage roads.
- High volume of **two-way bicycle traffic on one-way frontage roads**, especially on the east side.
- **High rate of bicycle collisions** on the Esplanade corridor with extremely high rates which are more than twice the average at 9 intersections (Memorial Way, Lincoln Avenue, Sacramento Avenue, 1st Avenue, 3rd Avenue, 4th Avenue, 7th Avenue, 8th Avenue, and 9th Avenue).
- **Non-existent bicycle lanes**, markings and bicycle circulation signage guidance.
- Non-existent and unclear bicycle connection between Esplanade and the 11th Avenue trail bridge.
- Recent bicycle fatality at Oleander Avenue/First Avenue.
- Driver **confusion** and vehicle-bicycle **conflicts** at intersections with frontage roads at east-west streets.



High School Area Congestion and Safety



- Very **high volume of pedestrian crossings** at Lincoln Avenue and Sacramento Avenue near the High School. Existing usage of the City of Chico Right-of-Way is occurring at high frequencies, without identified routes of travel. This creates significant liability for the City relating to Safety of the Public.



- Severe **congestion and shortage of pick-up/drop-off facilities** around Chico High School.
- No signalized intersection to assist left-turns from the High School onto the Esplanade.
- Poor vehicle circulation and access around Chico High School causing **traffic infiltration around the neighborhood**.



Esplanade to Memorial Avenue Accessibility

- **Lack of left-turn access** at Memorial Avenue causes traffic to seek other neighborhood routes to access Chico Jr. High School from southbound Esplanade.
- Lack of left-turn access at Memorial Avenue causes traffic to travel along the west side frontage road and into the State Park parking lot traffic circle to access eastbound Memorial Way.

State Parks Access and Use by the Public

- **State Parks has officially requested** to both the City Attorney's office, as well as Public Works Director, that the City modify the intersection of Esplanade/Memorial Way which would discourage vehicles from using their parking lot to access eastbound Memorial Way.



First Avenue Traffic Capacity

- **Green time given to First Avenue** traffic is the same as all other cross streets while the traffic volume is at least four times higher.
- Limited 'green time' at First Avenue results in **restricted capacity and excessive queuing** which generates driver frustration and a tendency to access less than optimal signal gaps.
- Lack of left-turn access causes traffic to access First Avenue via other neighborhood streets including left-turn movements at less than optimal uncontrolled locations.
- Prevailing conditions have generated the **highest traffic collisions on the corridor** which exceed the expected accident experience.

Junior High School Area Access and Congestion

- Congestion and **restricted driver sight distance** at Memorial Way/Oleander Avenue intersection.
- **Expanded student population** will cause additional capacity pressure on the Memorial Way/Oleander Avenue intersection during school hours.



General Vehicle Guidance and Confusion

- Lack of pavement markings and signage results in **confusion** between drivers, pedestrians and bicycles on right-of-way priority at frontage road intersections with east-west streets.
- Low hedge landscaping along the corridor **restricts driver sight distance** at frontage road intersections.

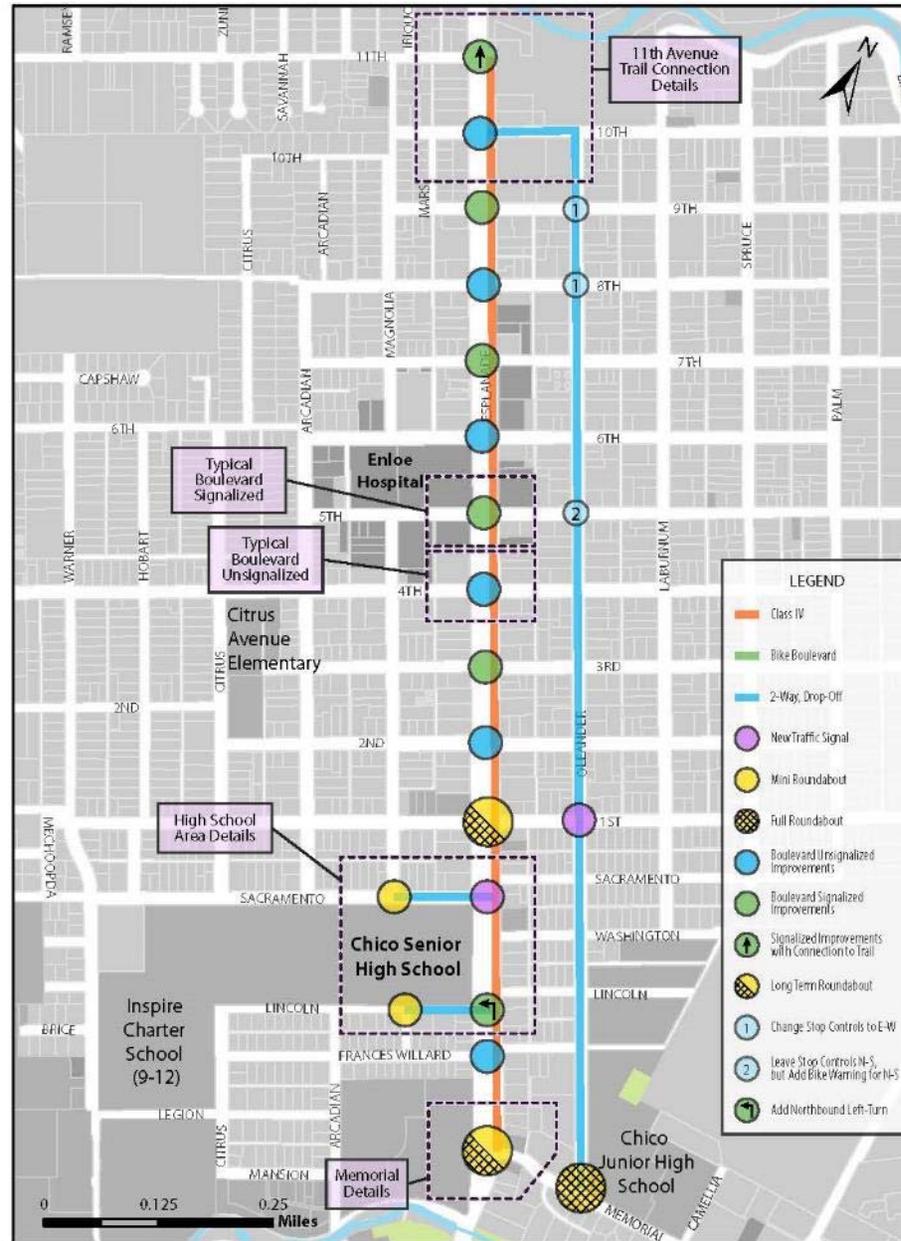
Recommendations



FACTORS IN DETERMINING RECOMMENDATIONS

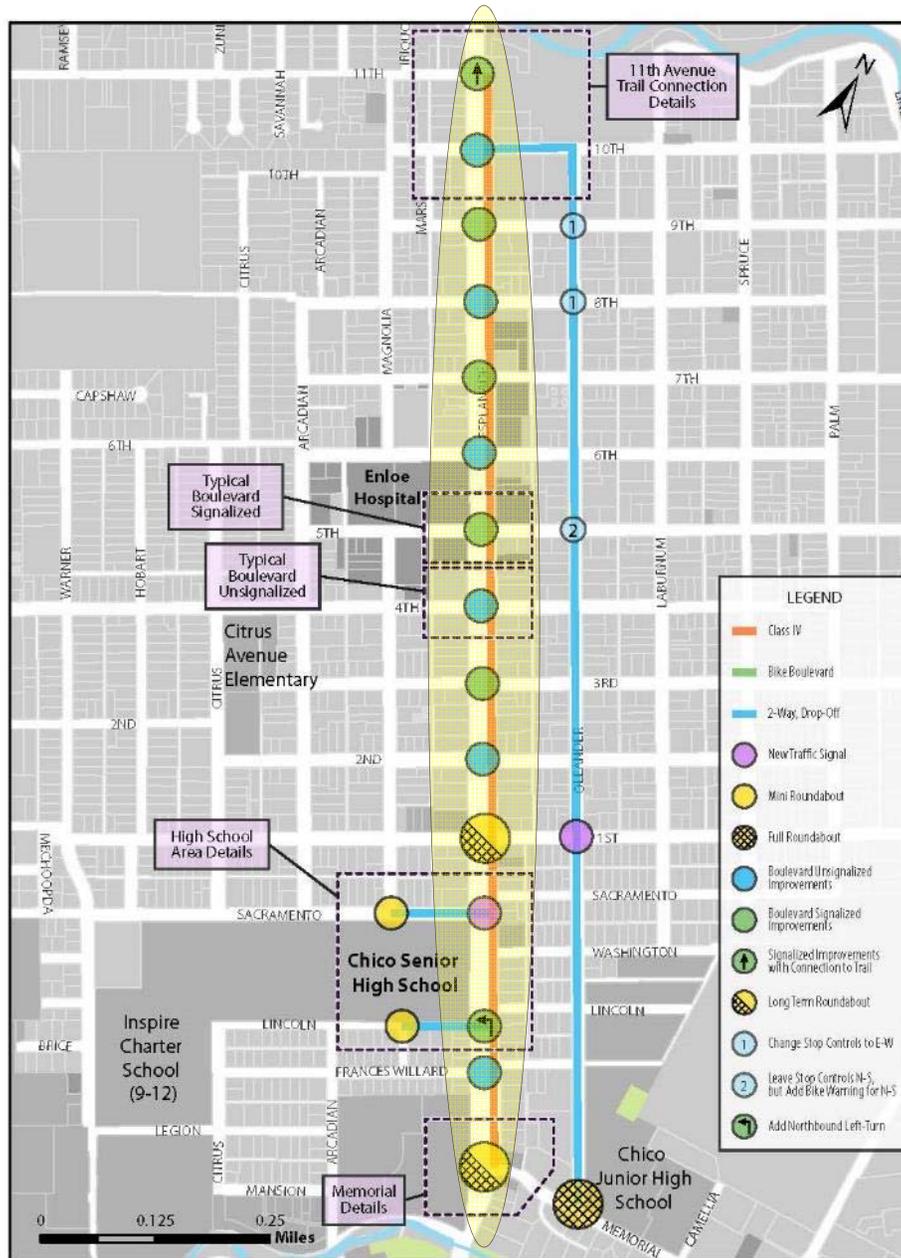
- Comments from the Council
- Input from key stakeholders in the corridor
- The public through the public process
- On-line surveys
- Need to meet traffic engineering standard practices and state guidelines
- Traffic Engineering analysis
- Collision history review
- Input from City staff
- Experience of the consulting team

STAFF REPORT ATTACHMENT A



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1. Pedestrian Crossing Recommendations



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Pedestrian Recommendations

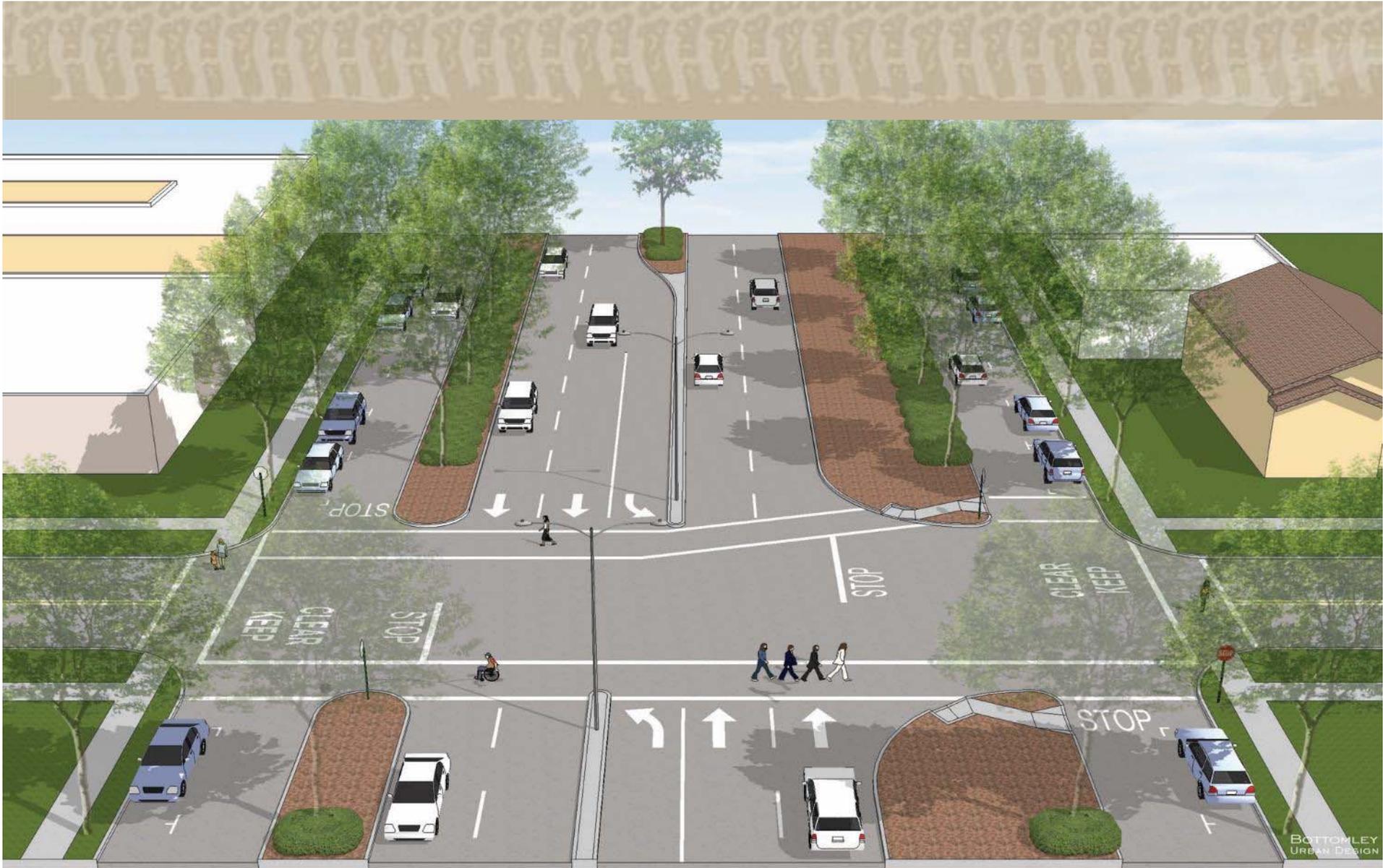
- a) New pedestrian **countdown crossing signal heads** and pedestrian push button activation at all existing traffic signals on the Esplanade with sufficient crossing timing which meets Federal guidelines.
- b) **Vehicle detection** on all approaches replacing timed signalization with an on-demand detection system.
- c) Adequate pedestrian crossing **refuge islands** at unsignalized intersections on the Esplanade.
- d) Consistently marked pedestrian crosswalks at all crossing locations.
- e) **Enhanced signal timing plan to respond to vehicles, bikes and pedestrian needs.**
- f) **Off-Peak signal timing plan** to simulate existing 28-mph free flow.



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|----------|---------|------|--------|------|------|--------|------|------|------------|--------|------|---------|----------|
| ← varies | 7' | 12' | 13' | 12' | 12' | 13' | 12' | 12' | 10' | 16' | 12' | 7' | varies → |
| Walk | Parking | Lane | Median | Lane | Lane | Median | Lane | Lane | Right Turn | Median | Lane | Parking | Walk |

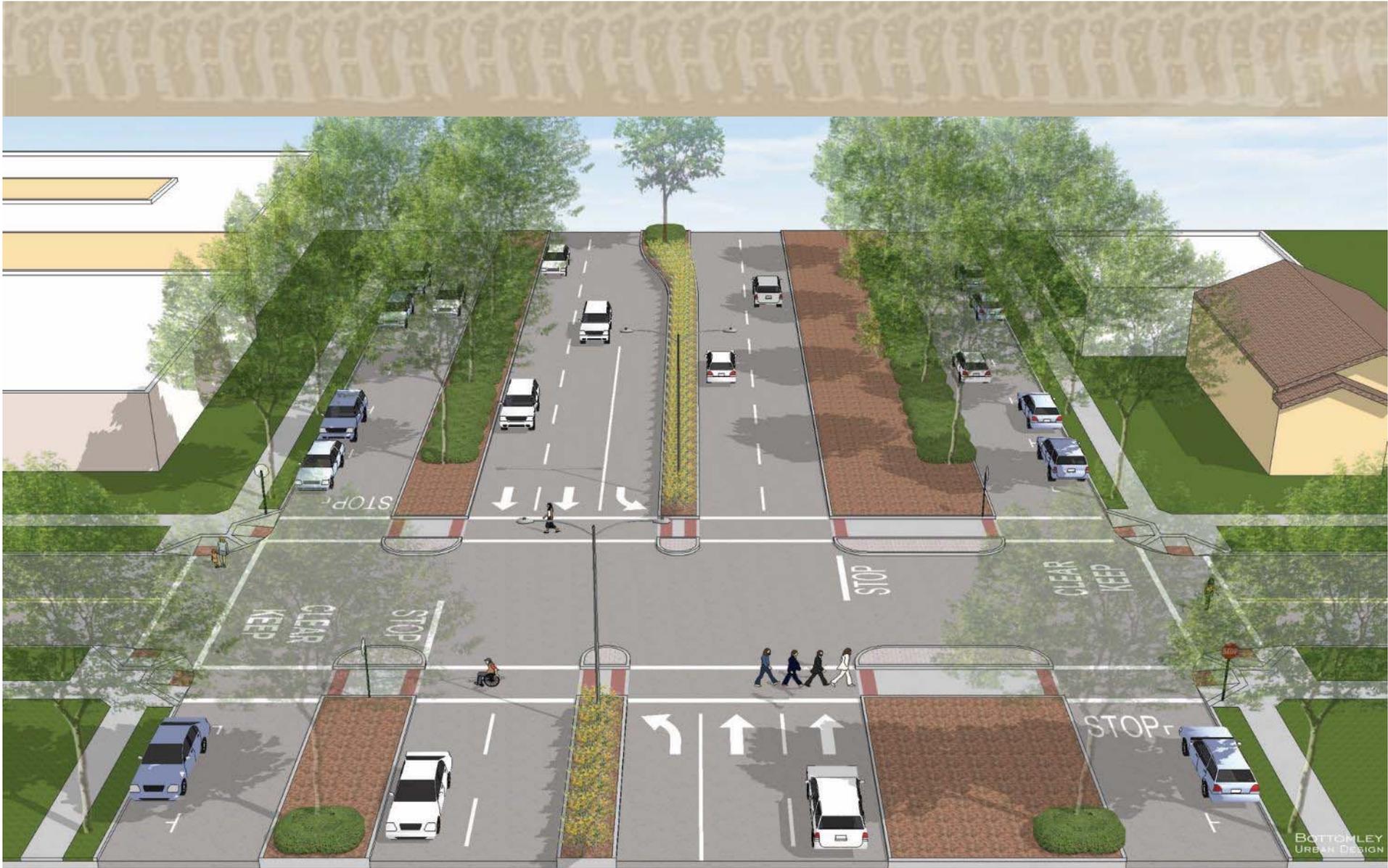


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|----------|---------|------|--------|------|------|--------|------|------|------------|--------|------|---------|----------|
| ← varies | 7' | 12' | 13' | 12' | 12' | 13' | 12' | 12' | 10' | 16' | 12' | 7' | varies → |
| Walk | Parking | Lane | Median | Lane | Lane | Median | Lane | Lane | Right Turn | Median | Lane | Parking | Walk |



BOTTOMLEY
URBAN DESIGN

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|--------|---------|------|--------|------|------|----|-----------|------|------|--------|------|---------|--------|
| varies | 7' | 12' | 13' | 12' | 12' | 3' | 10' | 12' | 12' | 28' | 12' | 7' | varies |
| Walk | Parking | Lane | Median | Lane | Lane | | Left Turn | Lane | Lane | Median | Lane | Parking | Walk |



| | | | | | | | | | | | | | |
|----------|---------|------|--------|------|------|----|-----------|------|------|--------|------|---------|--------|
| ← varies | 7' | 12' | 13' | 11' | 11' | 7' | 10' | 11' | 11' | 28' | 12' | 7' | varies |
| Walk | Parking | Lane | Median | Lane | Lane | | Left Turn | Lane | Lane | Median | Lane | Parking | Walk |

STAFF REPORT ATTACHMENT E



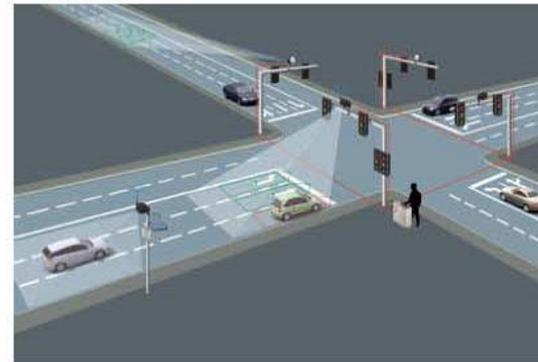
ADA Curb Ramp



Pedestrian
Signal Heads



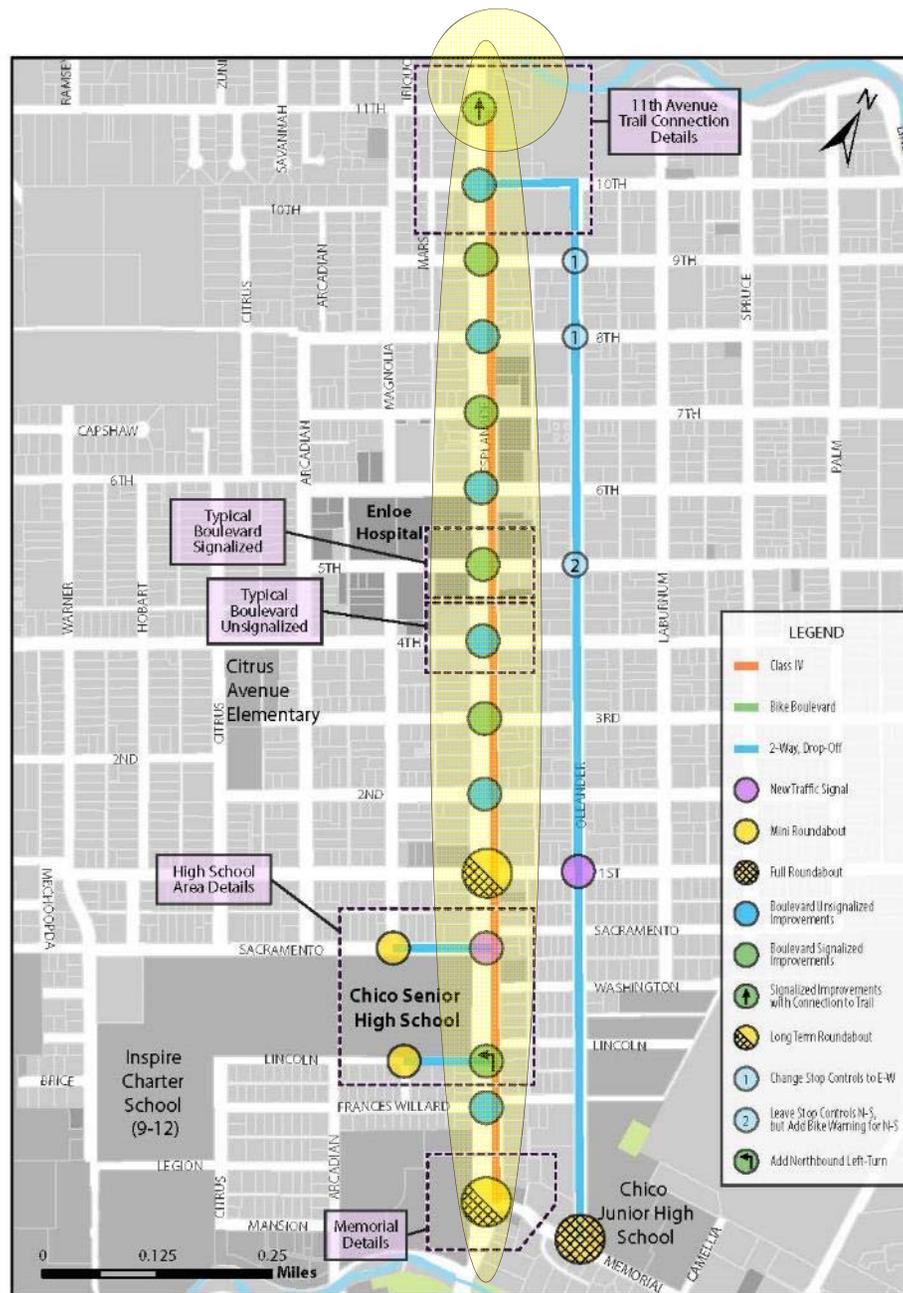
Pedestrian
Push Buttons



Vehicle Detection

2. ADA Accessibility Recommendations





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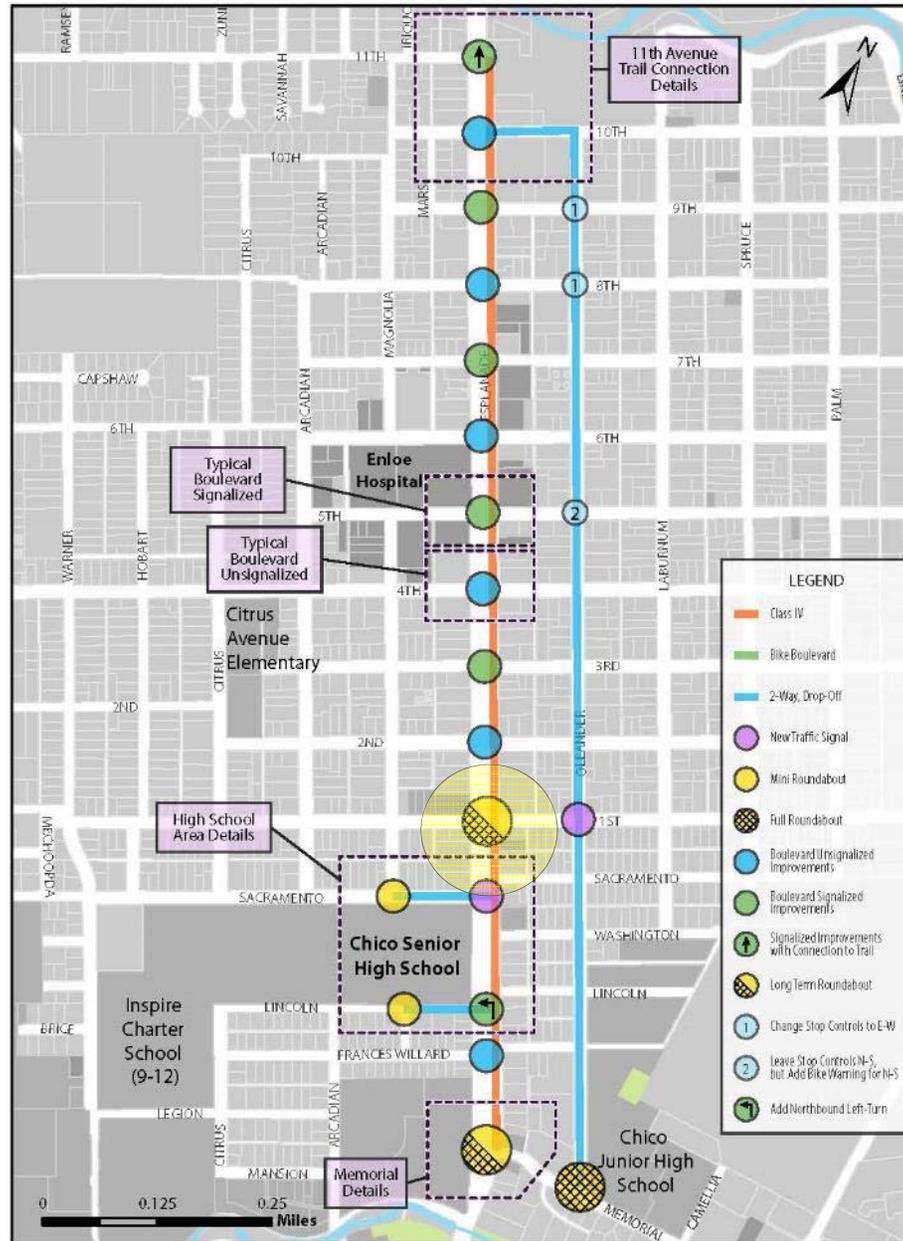


ADA Recommendations

- a) **Improved trail connection** to the 11th Avenue trail bridge with adequate walkway and ramps, as well as accessibility off of the Lindo Channel bridge on both the West and East sides.
- b) ADA acceptable **curb ramps** at all crosswalk locations.
- c) Sidewalk plan to provide missing **sidewalks** and reconstruct uneven sidewalk surfaces.

3. 1st Avenue Capacity Recommendations





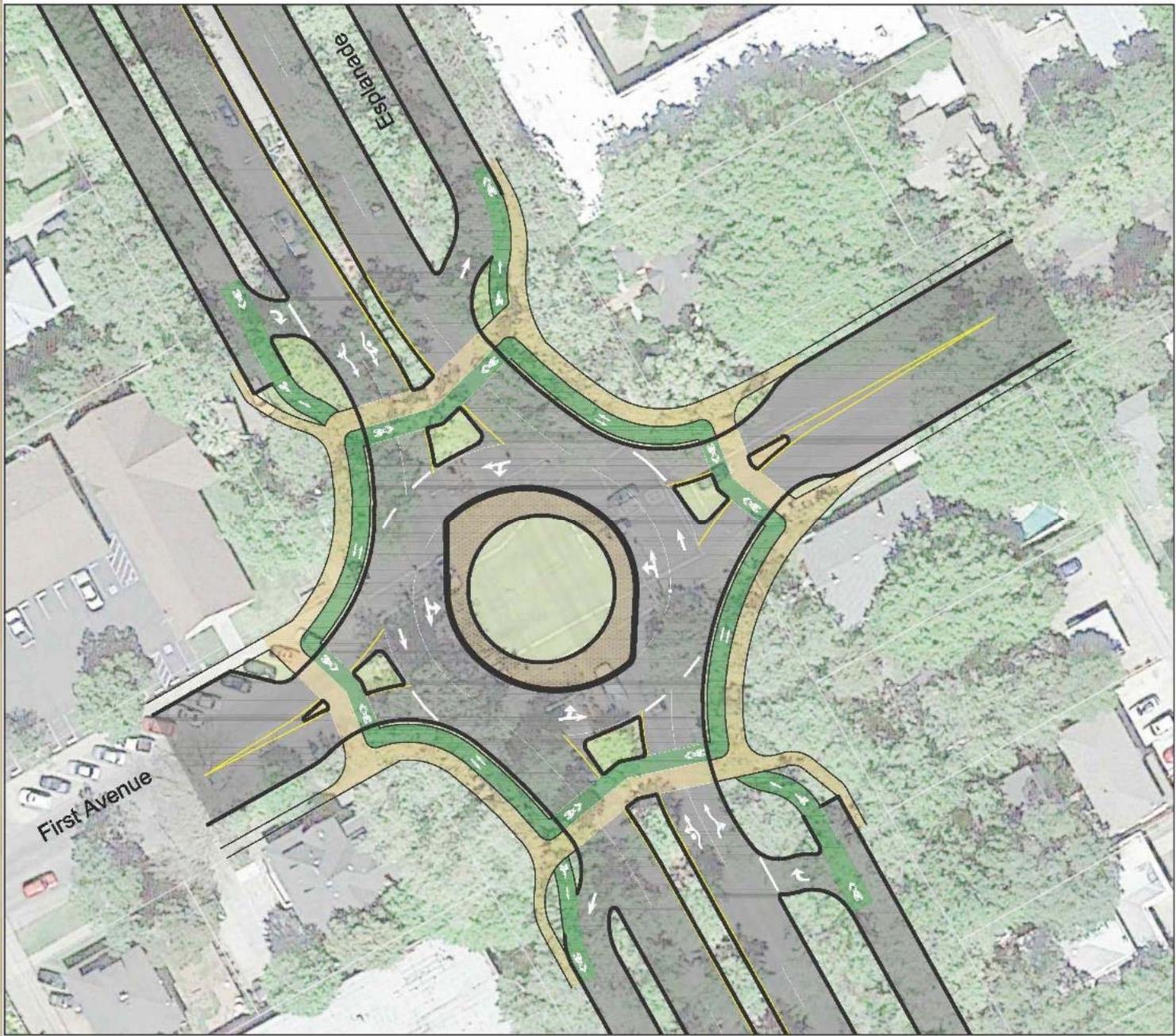
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First Avenue Recommendations

- a) New **roundabout** at Esplanade/1st Avenue with full four-way access as a long term mitigation.
- b) Updated signal timing plan to accommodate higher volumes on First Avenue.



STAFF REPORT ATTACHMENT I

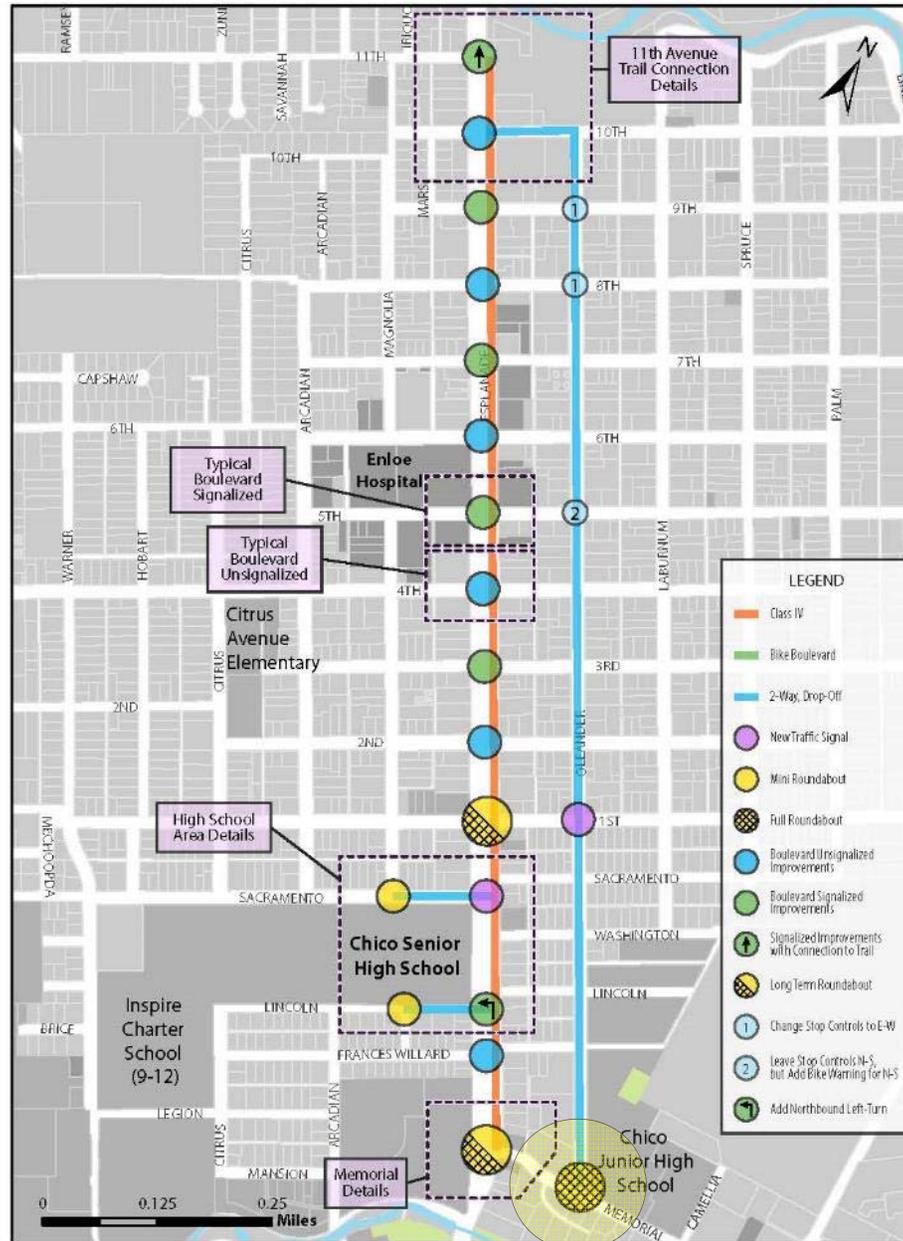


| | | | | | | |
|-------------|------|------|--------|------|------|-------------|
| ← varies | 13' | 14' | 13' | 14' | 13' | varies |
| Walk / Bike | Lane | Lane | Median | Lane | Lane | Walk / Bike |

BOTTOMLEY
URBAN DESIGN

4. Junior High School Area Access Recommendations





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➤ **Memorial/Oleander**

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Junior High School Recommendations

- a) New single-lane **roundabout** at Memorial Way/Oleander Avenue near Chico Jr. High School.
- b) Suggested future Safe Routes to School **assessment** to evaluate the campus safety more fully.



5. General Vehicle Guidance and Convenience
6. Other Amenities Recommendations



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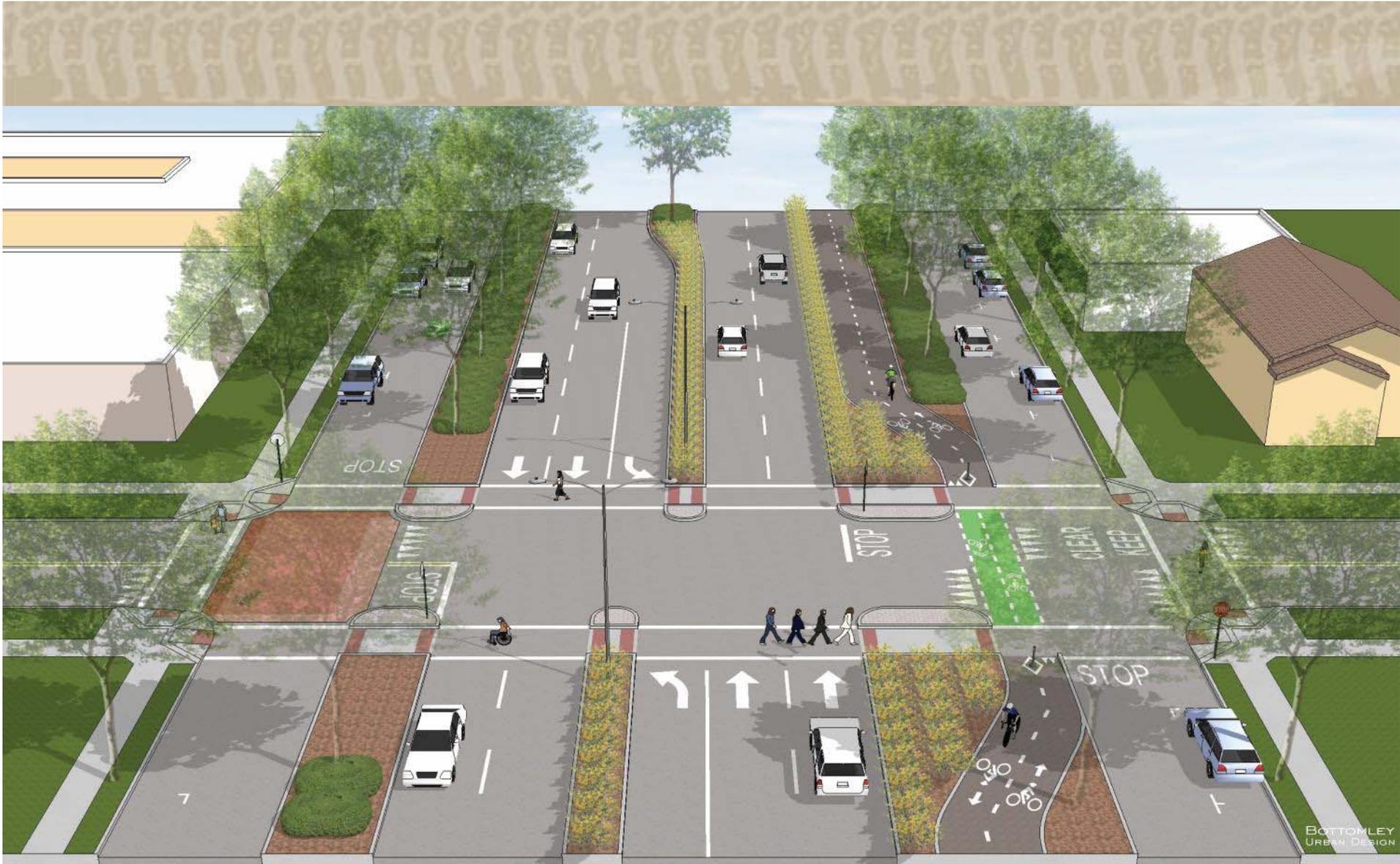


General Vehicle Guidance Recommendations

- a) Clear and consistent **pavement markings** at frontage road intersection areas.
- b) Creation of the **shared space area at crossings** of the E-W streets and frontage roads.
- c) **Vehicle detection** at all approaches of signalized intersections.
- d) Traffic signal indications guiding cross traffic to **stop "outside"** of the frontage road.

Other Amenities Recommendations

- a) Recommendation for a future **Landscaping Plan** to eliminate visual obstructions and upgrade all landscaping as appropriate.
- b) Recommendation for a future **Lighting Plan** to upgrade efficiency, function and aesthetics of lighting equipment.



BOTTOMLEY
URBAN DESIGN

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|----------|---------|------|--------|------|------|--------|-----------|------|------|----|-------------|--------|------|---------|--------|
| ← varies | 7' | 12' | 13' | 11' | 11' | 7' | 10' | 11' | 11' | 5' | 12'-8'-12' | 11' | 12' | 7' | varies |
| ← Walk | Parking | Lane | Median | Lane | Lane | Median | Left Turn | Lane | Lane | | Cycle Track | Median | Lane | Parking | Walk → |



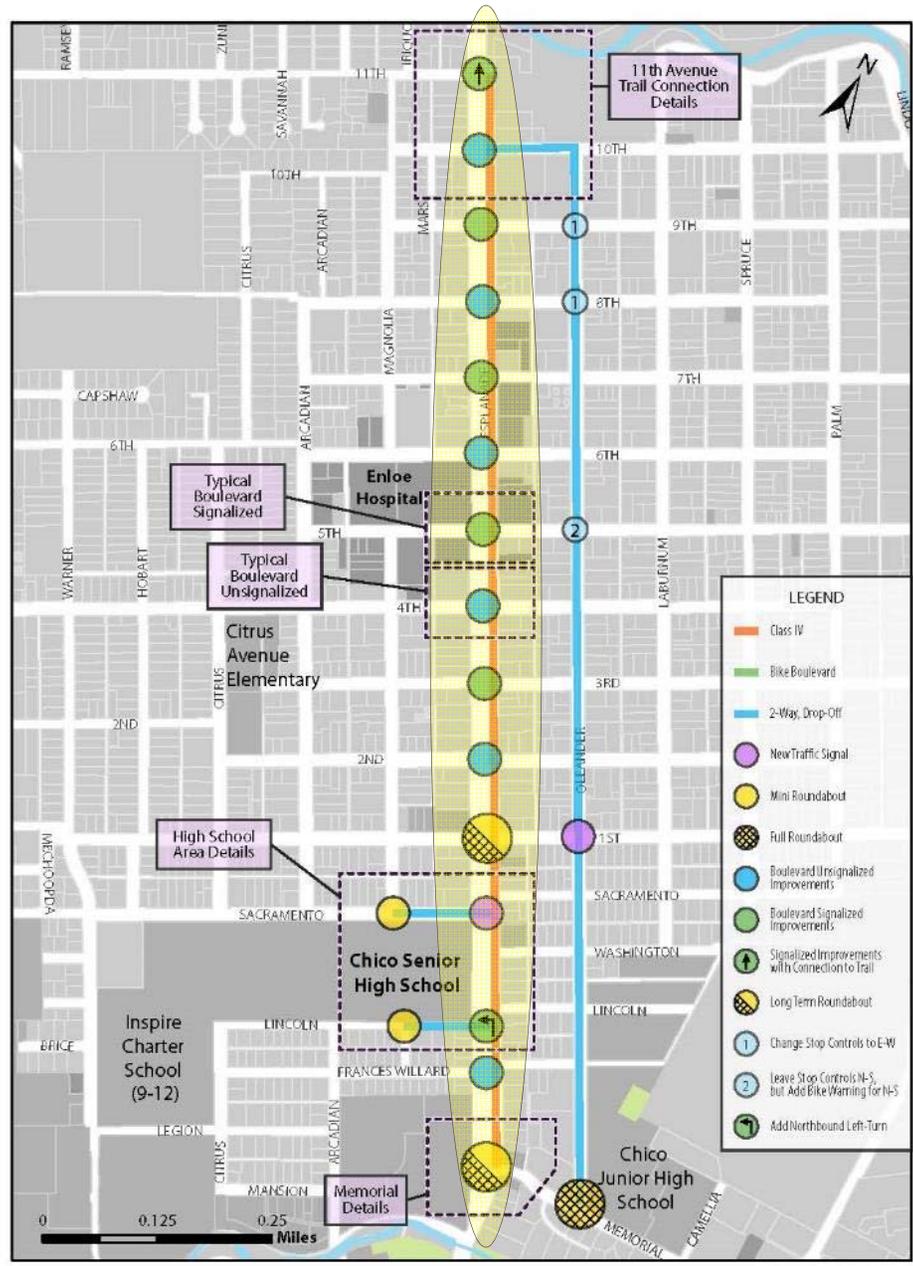
BOTTOMLEY
URBAN DESIGN

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| ← varies | 7' | 12' | 13' | 12' | 12' | 13' | 12' | 12' | 5' | 12'-8'-12' | 11' | 12' | 7' | varies |
| ← Walk | Parking | Lane | Median | Lane | Lane | Median | Lane | Lane | | Cycle Track | Median | Lane | Parking | Walk → |

Vehicle detection (loop, microwave or camera TBD) to be added on all vehicle lanes.



7. Bicycle Facilities/Crossing Recommendations



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Bicycle Facility Recommendations

- a) Two-way bike trail on old rail right-of-way (east side) with appropriate safety crossing measures.
- b) Discouragement, but acknowledgement of wrong-way riders on the west side frontage road with a shared space pavement design to slow vehicle and bicycle traffic through these conflict zones.
- c) **Three (3) Options - Bike Facility and Crossings.**
- d) Marked bicycle route on Oleander Avenue which favors minimal stopping except at First Avenue and Fifth Avenue.
- e) New traffic signal at Oleander Avenue/First Avenue with bike crossing emphasis.

STAFF REPORT ATTACHMENT J

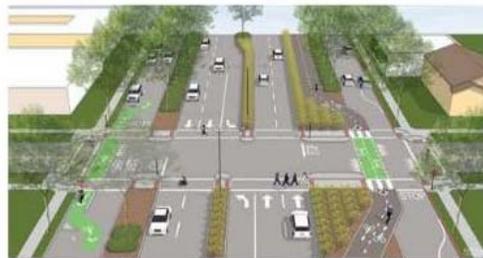
DISCUSSION: SEPARATED BIKE CROSSING DESIGN OPTIONS



Original Concept
Flush with Esplanade



New Preferred
Set Back Crossing



Pushed Out
with More Set Back



Pushed Out
to Outer Flank



Reoriented
Frontage Road

STAFF REPORT ATTACHMENT J

DISCUSSION: FRONTAGE ROAD CROSSING OPTIONS

West Side

Do
Nothing



Shared
Space



One-Way
Channelized



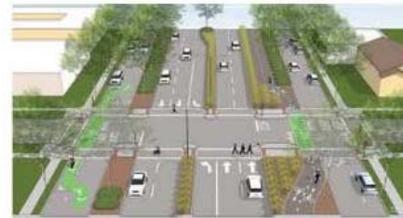
Reoriented
Frontage
Road



One-Way
Channelized



One-Way
Channelized



East Side

Do
Nothing

Shared
Space

One-Way
Channelized

Reoriented
Frontage
Road

Separated Bike
Two-Way
(Signalized)

Separated Bike
Two-Way
(Unsignalized)

STAFF REPORT ATTACHMENT F

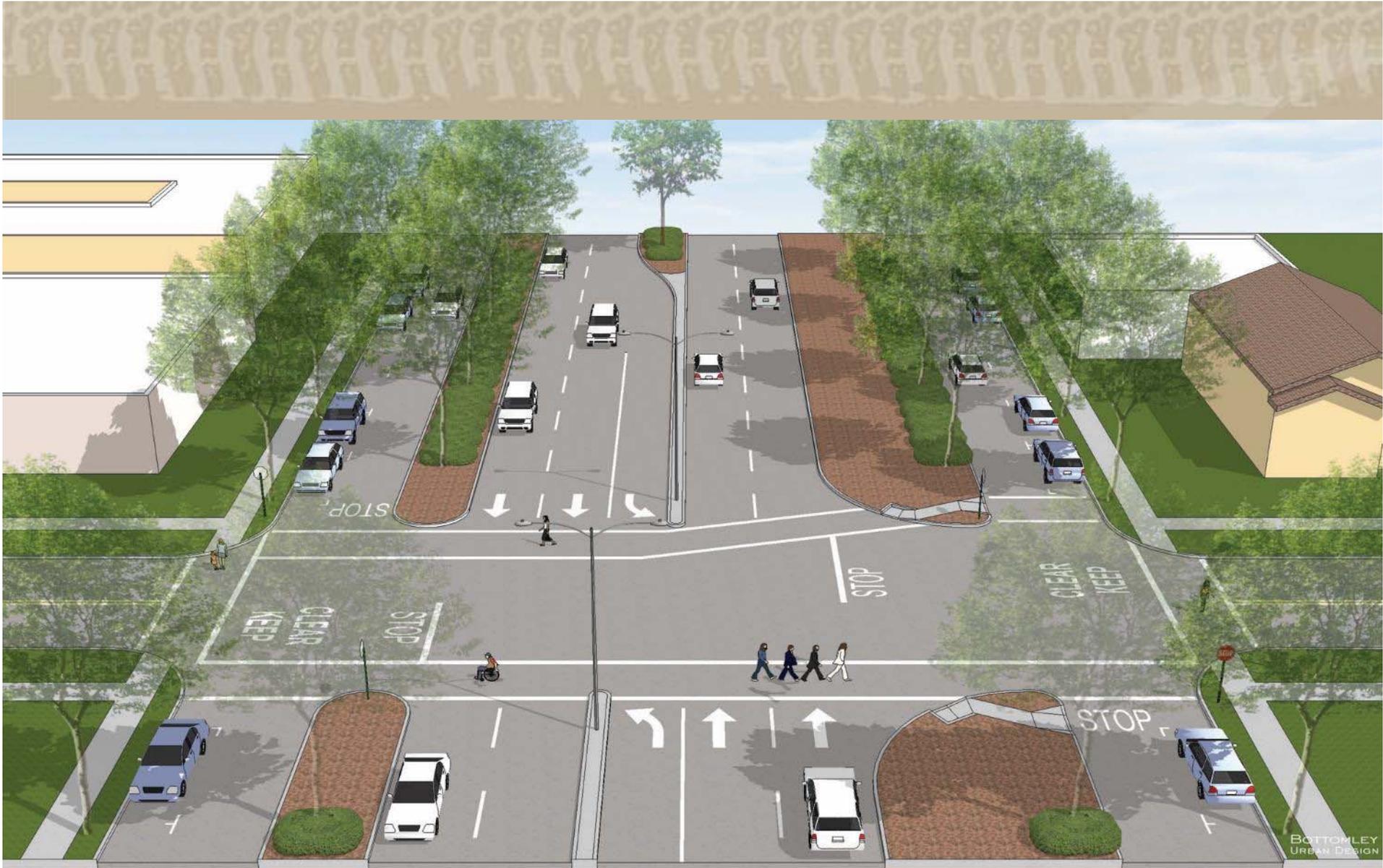
OPTION 1 PREFERRED CROSSINGS DESIGNS



Option 1 – Preferred Unsignalized Intersection



Option 1 – Preferred Signalized Intersection



BOTTOMLEY
URBAN DESIGN

| | | | | | | | | | | | | | |
|--------|---------|------|--------|------|------|----|-----------|------|------|--------|------|---------|--------|
| varies | 7' | 12' | 13' | 12' | 12' | 3' | 10' | 12' | 12' | 28' | 12' | 7' | varies |
| Walk | Parking | Lane | Median | Lane | Lane | | Left Turn | Lane | Lane | Median | Lane | Parking | Walk |



| | | | | | | | | | | | | | | | | |
|----------|---------|------|--------|------|------|--------|-----------|------|------|----|-------------|--------|------|---------|--------|---|
| ← varies | 7' | 12' | 13' | 11' | 11' | 7' | 10' | 11' | 11' | 5' | 12'-8'-12' | 11' | 12' | 7' | varies | → |
| Walk | Parking | Lane | Median | Lane | Lane | Median | Left Turn | Lane | Lane | | Cycle Track | Median | Lane | Parking | Walk | |



BOTTOMLEY
URBAN DESIGN

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|----------|---------|------|--------|------|------|--------|------|------|------------|--------|------|---------|--------|
| ← varies | 7' | 12' | 13' | 12' | 12' | 13' | 12' | 12' | 10' | 16' | 12' | 7' | varies |
| ← Walk | Parking | Lane | Median | Lane | Lane | Median | Lane | Lane | Right Turn | Median | Lane | Parking | Walk → |



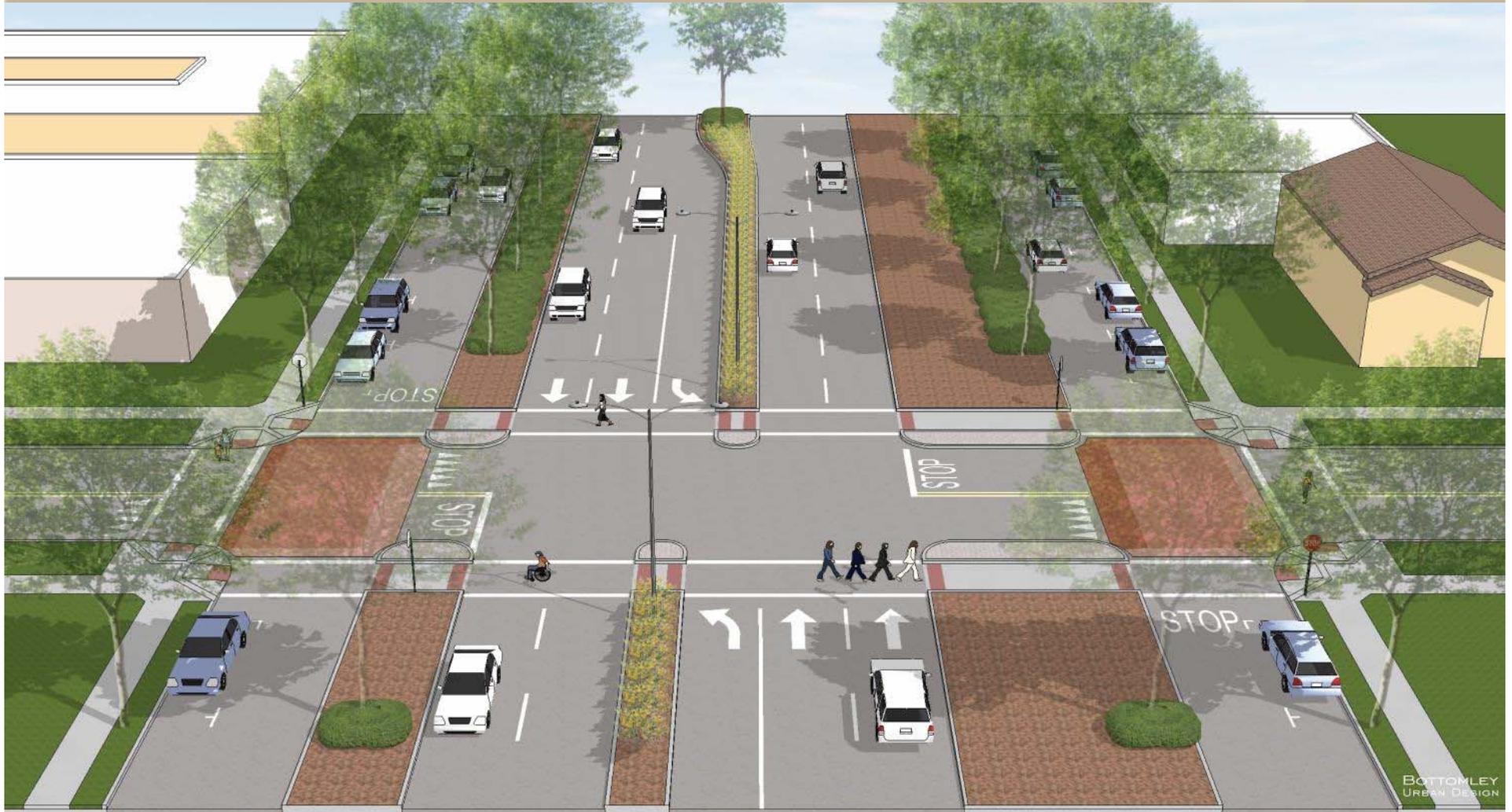
BOTTOMLEY
URBAN DESIGN

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| ← varies | 7' | 12' | 13' | 12' | 12' | 13' | 12' | 12' | 5' | 12'-8'-12' | 11' | 12' | 7' | varies |
| ← Walk | Parking | Lane | Median | Lane | Lane | Median | Lane | Lane | | Cycle Track | Median | Lane | Parking | Walk |

Vehicle detection (loop, microwave or camera TBD) to be added on all vehicle lanes.

**STAFF REPORT
ATTACHMENT F**

**OPTION 2
SHARED SPACE ONLY**



| | | | | | | | | | | | | | |
|----------|---------|------|--------|------|------|--------|-----------|------|------|--------|------|---------|----------|
| ← varies | 7' | 12' | 13' | 11' | 11' | 7' | 10' | 11' | 11' | 28' | 12' | 7' | varies → |
| Walk | Parking | Lane | Median | Lane | Lane | Median | Left Turn | Lane | Lane | Median | Lane | Parking | Walk |

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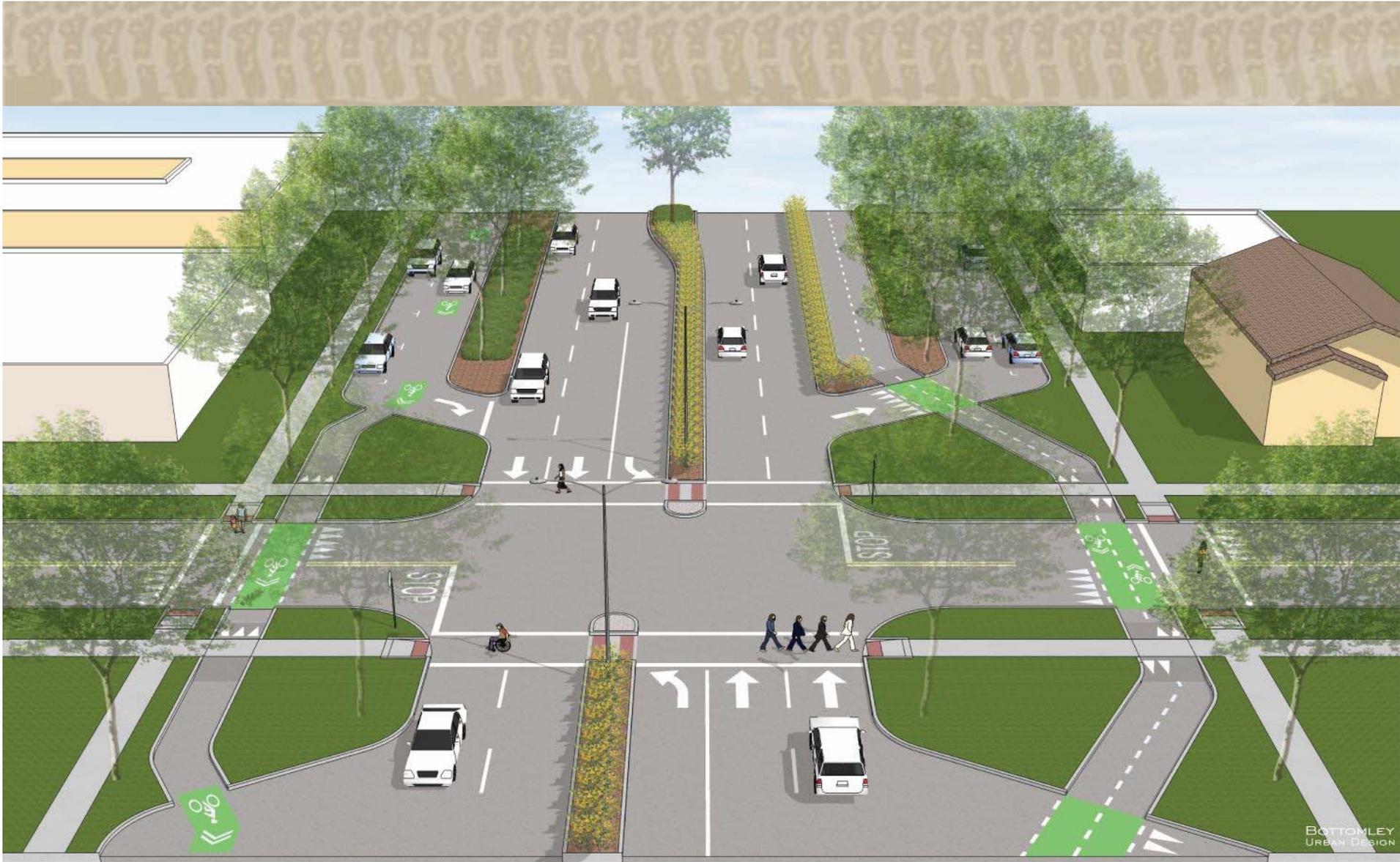
OPTION 3 MIX OF REORIENTED/ PREFERRED



Option 3 – Reoriented Unsignalized Intersections



Option 3 – Preferred Modification at Signalized Intersections



BOTTOMLEY
URBAN DESIGN

| | | | | | | | | | |
|--------|---------------------|------|------|--------|-----------|------|------|---------------------|--------|
| varies | 32' | 12' | 12' | 7' | 10' | 12' | 12' | 47' | varies |
| ← Walk | Bulb-Out & Bike Way | Lane | Lane | Median | Left Turn | Lane | Lane | Bulb-Out & Bike Way | Walk → |



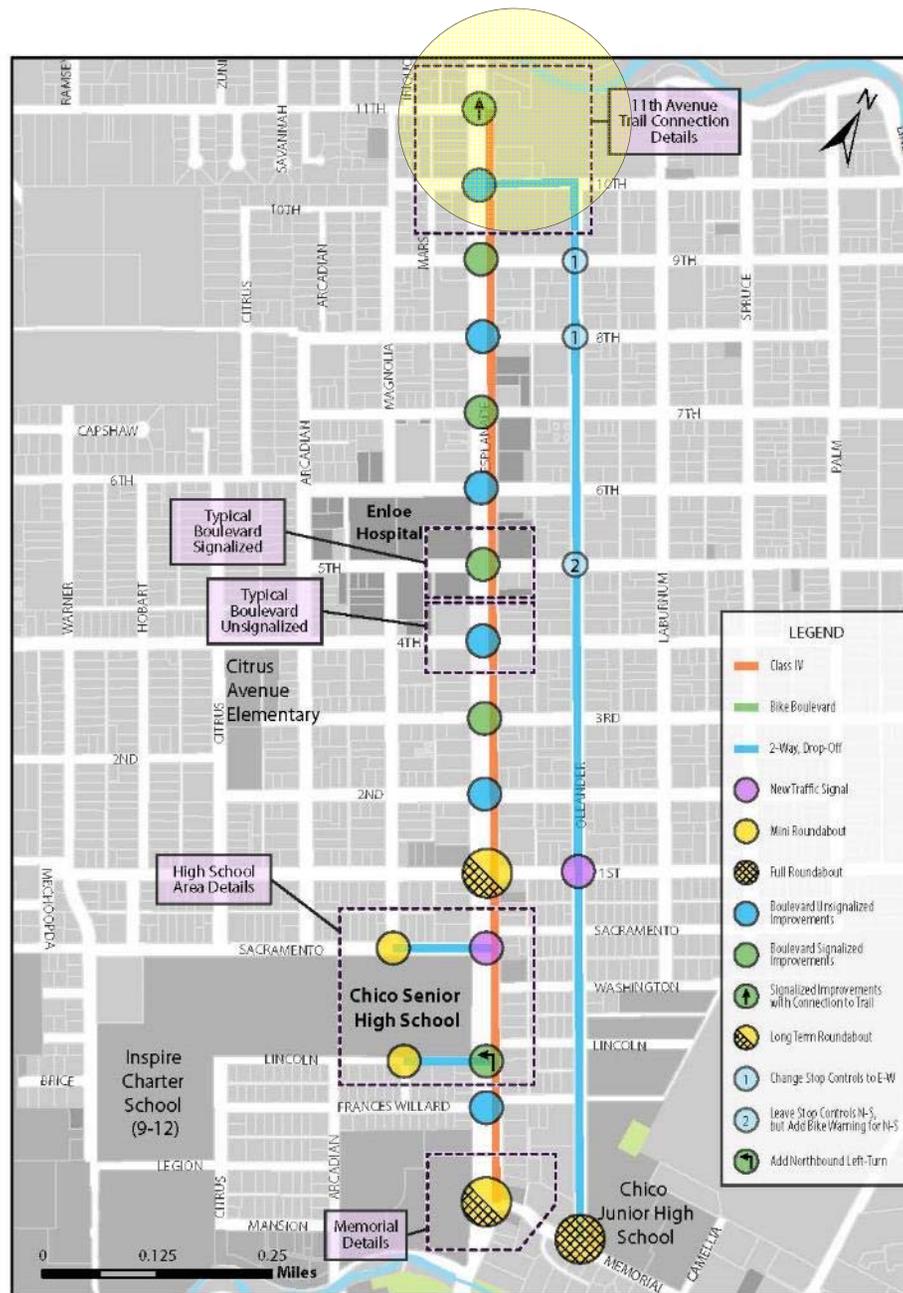
BOTTOMLEY
URBAN DESIGN

| | | | | | | | | | | | | | | | |
|----------|---------|------|--------|------|------|--------|------|------|----|-------------|--------|------|---------|--------|---|
| ← varies | 7' | 12' | 13' | 12' | 12' | 13' | 12' | 12' | 5' | 12'-8'-12' | 11' | 12' | 7' | varies | → |
| Walk | Parking | Lane | Median | Lane | Lane | Median | Lane | Lane | | Cycle Track | Median | Lane | Parking | Walk | |

Vehicle detection (loop, microwave or camera TBD) to be added on all vehicle lanes.

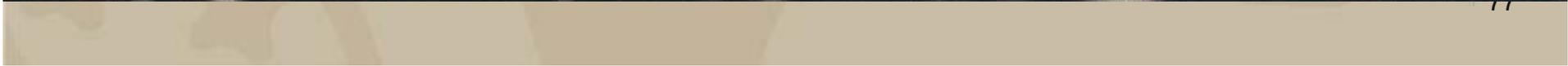
8. Bike Crossing Options at 11th Avenue





900-17.chi 2016.ai 3/16





STAFF REPORT ATTACHMENT A



11th Avenue Connection Recommendations

- Three (3) Options - connections to 11th Avenue bridge



**STAFF REPORT
ATTACHMENT G**

**OPTION 1
PREFERRED
CONNECTION**



Esplanade Area Complete Street Plan

11th Avenue Option 1
(Preferred Connection)

STAFF REPORT ATTACHMENT G

OPTION 2



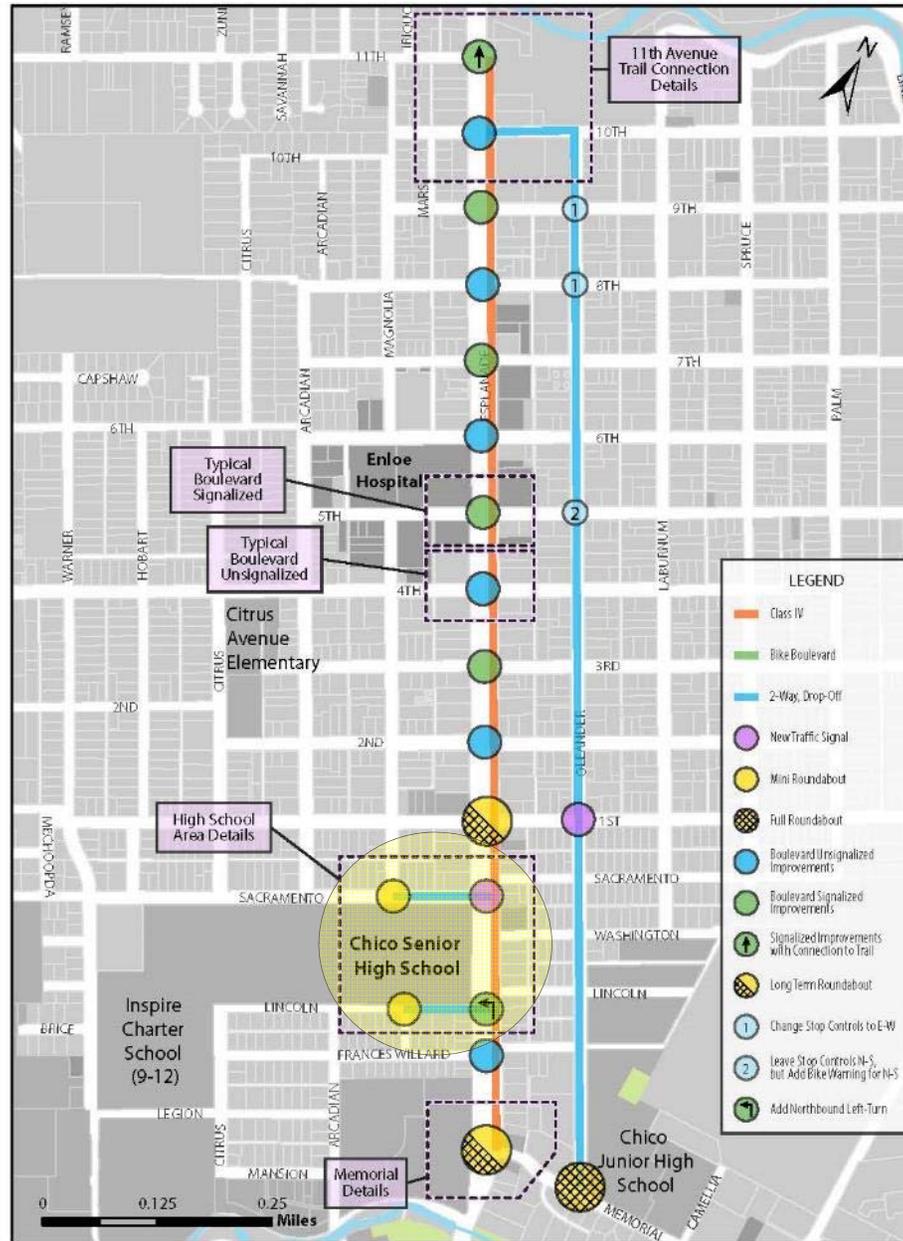
STAFF REPORT ATTACHMENT G

OPTION 3



9. High School Area Access and Safety Recommendations





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STAFF REPORT ATTACHMENT A



High School Area Recommendations

a) Minor widening on the Chico High School side of Lincoln Avenue and West Sacramento Avenue for **expansion of pick-up/drop-off frontage**.



b) Conversion of Lincoln Avenue to **two-way traffic** between Esplanade and Arcadian Avenue.



c) **Turnaround traffic circles** at Lincoln Avenue/Arcadian Avenue and Sacramento Avenue/Magnolia Avenue.

d) New **traffic signal** at Esplanade/West Sacramento Avenue.

e) New **northbound left-turn lane** at Esplanade/Lincoln Avenue.

f) Esplanade **signal timing plan** specific for school hours to favor access to/from Chico High School.

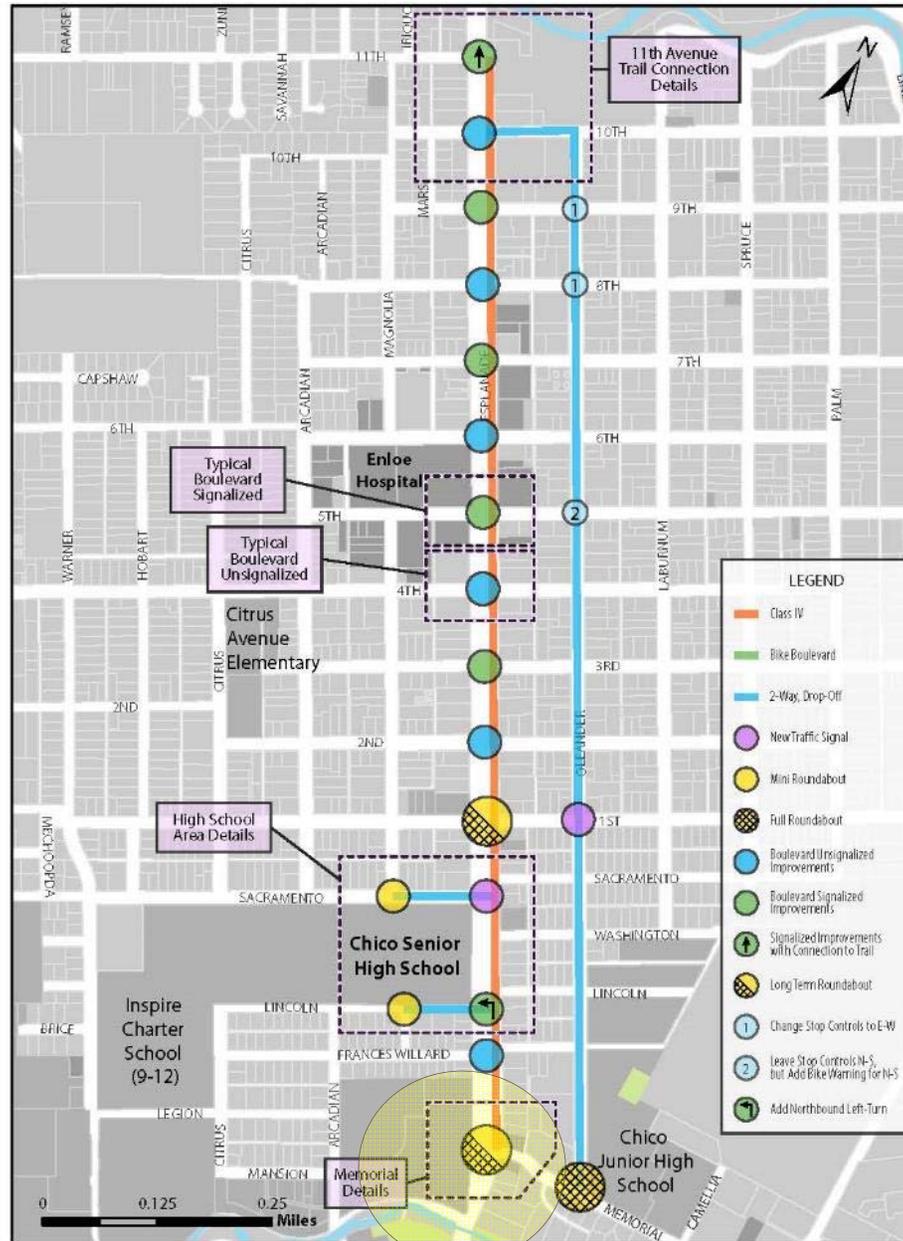
STAFF REPORT ATTACHMENT H





10. Esplanade to Memorial Avenue Accessibility/ State Parks Access and Use by the Public





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Esplanade to Memorial Recommendations

- a) New northbound/southbound **left-turn lane** on Esplanade at Memorial Way traffic signal as a short term mitigation.
- b) New **roundabout** at Esplanade/Memorial Way with full four-way access as a long term mitigation.

STAFF REPORT ATTACHMENT A



State Park Access Recommendations

- a) **Reorientation** of the west side frontage road to eliminate the connection to the State Park parking lot.

- b) The left-turn access and future **roundabout** at Esplanade/Memorial Way would preclude the need for traffic to enter the parking lot

STAFF REPORT ATTACHMENT I



BOTTOMLEY
URBAN DESIGN

| | | | | | | | | | | | |
|----------|------|------|--------|------|------|--------|--------|------|---------|--------|---|
| ← varies | 13' | 13' | 8' | 12' | 12' | 12' | 8' | 16' | 8' | varies | → |
| Walk | Lane | Lane | Median | Lane | Lane | Buffer | Median | Lane | Parking | Walk | |

STAFF REPORT ATTACHMENT I



| | | | | | | | | | | | |
|----------|------|------|--------|-----------|------|--------|--------|------|---------|--------|---|
| ← varies | 13' | 13' | 8' | 12' | 12' | 12' | 8' | 16' | 8' | varies | → |
| Walk | Lane | Lane | Median | Left Turn | Lane | Buffer | Median | Lane | Parking | Walk | |

BOTTOMLEY
URBAN DESIGN

STAFF REPORT ATTACHMENT I



| | | | | | | |
|-------------|------|------|--------|------|------|-------------|
| ← varies | 13' | 14' | 13' | 14' | 13' | varies → |
| Walk / Bike | Lane | Lane | Median | Lane | Lane | Walk / Bike |

BOTTOMLEY
URBAN DESIGN

Roundabout Discussion



Safety

- Intersection Safety
- Crash Facts
- Human Factors
- Pedestrians & Bicycles
- Innovative Intersections
- Conventional Intersections
- Rural & Local
- Other Topics
- Program Contact**

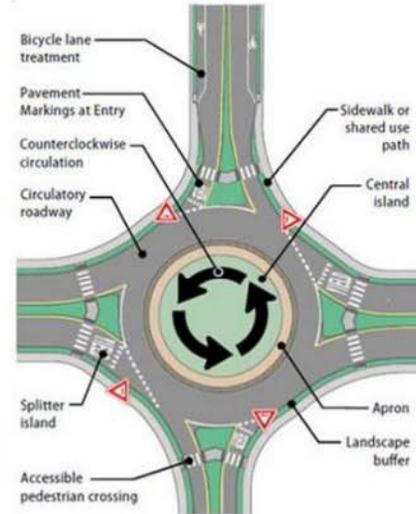
Jeffrey Shaw
jeffrey.shaw@dot.gov

Roundabouts and Mini Roundabouts

Outreach & Education
Technical Materials
Other Resources
State & Federal Research
National Partners

A roundabout is a type of circular intersection, but is quite unlike a neighborhood traffic circle or large rotary. Roundabouts have been proven safer and more efficient than other types of circular intersections.

Roundabouts have certain distinguishing features and characteristics (as shown in the adjacent diagram). While these noted features are common to many roundabouts, they are not always present, as roundabouts are adapted to the context of the location. In fact, roundabouts don't even need to be perfectly circular! Successful roundabouts come in all shapes and sizes. Some are oval-, teardrop-, peanut- and dogbone- shaped. Some have as few as three legs and others as many as six. There are small, simple mini roundabouts, and larger, more complex multilane roundabouts. However, regardless of size, circular shape, or number of legs, the fundamental and essential characteristics of all roundabouts include:



Counterclockwise Flow. Traffic travels counterclockwise around a center island.

Entry Yield Control. Vehicles entering the roundabout yield to traffic already circulating.

Low Speed. Curvature that results in lower vehicle speeds, generally 15-25 MPH, throughout the roundabout.

Roundabouts can provide lasting benefits and value in many ways. They are often safer, more efficient, less costly and more aesthetically appealing than conventional intersection designs. Furthermore, roundabouts are an excellent choice to complement other transportation objectives – including Complete Streets, multimodal networks, and corridor access management – without compromising the ability to keep people and freight moving through our towns, cities and regions, and across the Nation. The FHWA Office of Safety identified roundabouts as a **Proven Safety Countermeasure** because of their ability to substantially reduce the types of crashes that result in injury or loss of life. Roundabouts are designed to improve safety for all users, including pedestrians and bicycles.

Most significantly, roundabouts REDUCE the types of crashes where people are seriously hurt or killed by 78-82% when

<http://safety.fhwa.dot.gov/intersection/innovative/roundabouts/>

Roundabouts Are Safer Than Traditional Intersections

- 90% reduction in fatalities
- 76% reduction in injuries
- 35% reduction in all crashes



Modern Roundabouts | A Safer Choice





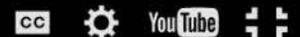
Benefits of Roundabouts

- Increased safety
- Improved traffic flow
- Reduced emissions
- Lower costs
- Community livability

Modern Roundabouts | A Safer Choice



▶ 🔊 4:20 / 10:57





Manzanita Avenue/East Avenue/Wildwood Avenue



1st Street-2nd Street/Flume Street



West 1st Street/Salem Street

Why Roundabouts for Esplanade

- City has experience with existing roundabouts
- Roundabouts will allow for better corridor traffic flow
- Can address State Parks concerns
- Safer traffic control option
- Environmental benefits
- Opportunity for urban design and gateway treatments
- Lower operating costs (\$6,000 savings per int per year)
- May attract potential funding (vs. traffic signal)



NEXT STEPS

- April - Finalize Preferred Concept Plan and Report
- Present at a Hearing for Council Consideration of Plan Adoption
- June 15th - ADTP Grant Application Deadline
- 2017 Awards for ATP Cycle 3 Announced
- 2018 Design Improvements (if awarded) to be reviewed by Council
- 2019/2020 Construction

ACTIVE TRANSPORTATION GRANT

The purpose of ATP is to encourage increased use of active modes of transportation by achieving the following goals:

- Increase the proportion of trips accomplished by biking and walking,
- Increase safety and mobility for non-motorized users,
- Advance the active transportation efforts of regional agencies to achieve greenhouse gas (GHG) reduction goals, pursuant to SB 375 (Of 2008) and SB 341 (of 2009),
- Enhance public health,
- Ensure that disadvantaged communities fully share in the benefits of the program, and
- Provide a broad spectrum of projects to benefit many types of active transportation users.

Call for Projects - Due June 15th 2016

State Funding = \$240 Million

BCAG/Butte County Projects have received - \$10 Million through first two cycles. (Chico Bikeway 99 Phase IV \$800,000)