



CONNECTING CENTRAL WINDSOR



Presentation to the
Sonoma County Transportation Authority
Citizens Advisory Committee

September 25, 2017

STEVEN GROVER & ASSOCIATES 

CONNECTING WINDSOR SCTA MEASURE M PROGRAMMING

- In March 2016, the Town of Windsor applied for a Measure M grant for bicycle-pedestrian studies
- The SCTA Board approved the requested Measure M program funding in the amount of \$250,000
- Town of Windsor has invoiced SCTA for a total of \$232,507
 - This presentation will provide a brief overview of the project and work completed thus far
- Remaining Measure M appropriation in the amount of \$17,793
 - Anticipated work consists of completing the Connecting Windsor Feasibility Study, which will include 15% drawings and content to help the Town move the project into the Caltrans PID phase.
 - Work is anticipated to conclude in December 2017

PRESENTATION OUTLINE

- Purpose & Need Overview
- Analysis & Community Input
- Goals & Key Solutions

Visit www.ConnectingWindsor.com for more information

ACTIVE TRANSPORTATION BENEFITS

- Individual & Community Health
- Modal Shift & Greenhouse Gas Reduction
- Local Business Revenue
- Increased Property Values
- Tourism



ACTIVE TRANSPORTATION BENEFITS

THE ROLE OF Transportation IN PROMOTING PHYSICAL ACTIVITY

TRAFFIC CALMING
Medians, speed bumps and other traffic-calming efforts can reduce the number of automobile crashes with pedestrian injuries by up to **15%**

PUBLIC TRANSPORTATION
Public transit users take **30%** more steps per day than people who rely on cars.

SIDEWALKS
People who live in neighborhoods with sidewalks on most streets are **47%** more likely to be active at least 30 minutes a day.

BIKE FACILITIES
In Portland, Ore., bicycle commuters ride **49%** of their miles on roads with bike facilities, even though these are only 8% of road miles.

Active Living Research
www.activelivingresearch.org

Sources: SIDEWALKS: Sallis J, Bowles H, Bauman A, et al. "Neighborhood Environments and Physical Activity among Adults in 11 Countries." American Journal of Preventive Medicine, 36(6): 484-490, June 2009. BIKE LANES: Dill J et al. Bicycling for Transportation and Health: The Role of Infrastructure. Journal of Public Health Policy (2009) 30, 595-5710. doi:10.1057/jphp.2009.56). TRAFFIC CALMING: Bunn F, Collier T, Frost C, et al. "Area-Wide Traffic Calming for Preventing Traffic Related Injuries." Cochrane Database of Systematic Reviews (1), January 2003; Elvik R. "Area-Wide Urban Traffic Calming Schemes: A Meta-Analysis of Safety Effects." Accident Analysis and Prevention, 33(3): 327-336, May 2001. PUBLIC TRANSPORTATION: Edwards R. "Public Transit, Obesity, and Medical Costs: Assessing the Magnitudes." Preventive Medicine, 46(1): 14-21, January 2008.

THE BENEFITS OF CYCLING [HEALTH & COMMUNITY]

Cyclists are a diverse group. Some of us ride fat tires down rocky trails, some of us ride road bikes up burly hills, some of us ride for sport and some of us ride just for fun. Some ride for the adrenaline rush and some ride their bikes for basic transportation.

Bicycling, along with being the most efficient mode of human locomotion, is also one of the best all-around activities for improving our health and communities.

www.atlantabike.org • www.peoplepoweredmovement.org

ATLANTA BICYCLE COALITION

2 CYCLING IS THE SECOND MOST POPULAR OUTDOOR ACTIVITY IN THE U.S.
Source: Outdoor Foundation, 2010

47% OF AMERICANS SAY THEY WOULD LIKE MORE BIKE FACILITIES IN THEIR COMMUNITIES.
Source: National Highway Traffic Safety Administration.

MENTAL HEALTH
Cycling has a relaxing effect due to uniform, movement which stabilizes physical and emotional functions. It reduces anxiety, depression and other psychological problems.

BACK PAIN
Cycling posture is optimum, and the cyclic movement of the legs stimulates muscles in the lower back.

WAISTLINE
Cycling is ideal for targeting problem areas. It enables people who can not move easily to exercise. It increases fitness and stimulates the body's fat metabolism.

JOINTS
The circular movement of cycling assists the transport of energy and other metabolic products to the cartilages, reducing the likelihood of arthrosis.

MUSCLES
A week of inactivity reduces the strength of the muscular system by up to 50% and can harm them long-term. During cycling, most of the body's muscles are activated.Source: Cavill N, Davis A. 2007. "Cycling and Health: what's the evidence?" Cycling England.

BALANCE
Cycling produces the balance between exertion and relaxation which is so important for the body's inner equilibrium.

HEART
All the risk factors that lead to a heart attack are reduced and regular cycling reduces the likelihood of heart attack by more than 50%.

COORDINATION
Moving both feet around in circles while steering with both your hands and your body's own weight is good practice for your coordination skills.

STUDIES HAVE SHOWN THAT HOMES CLOSER TO BIKE PATHS ARE MORE VALUABLE.
Source: Bikes Belong Foundation

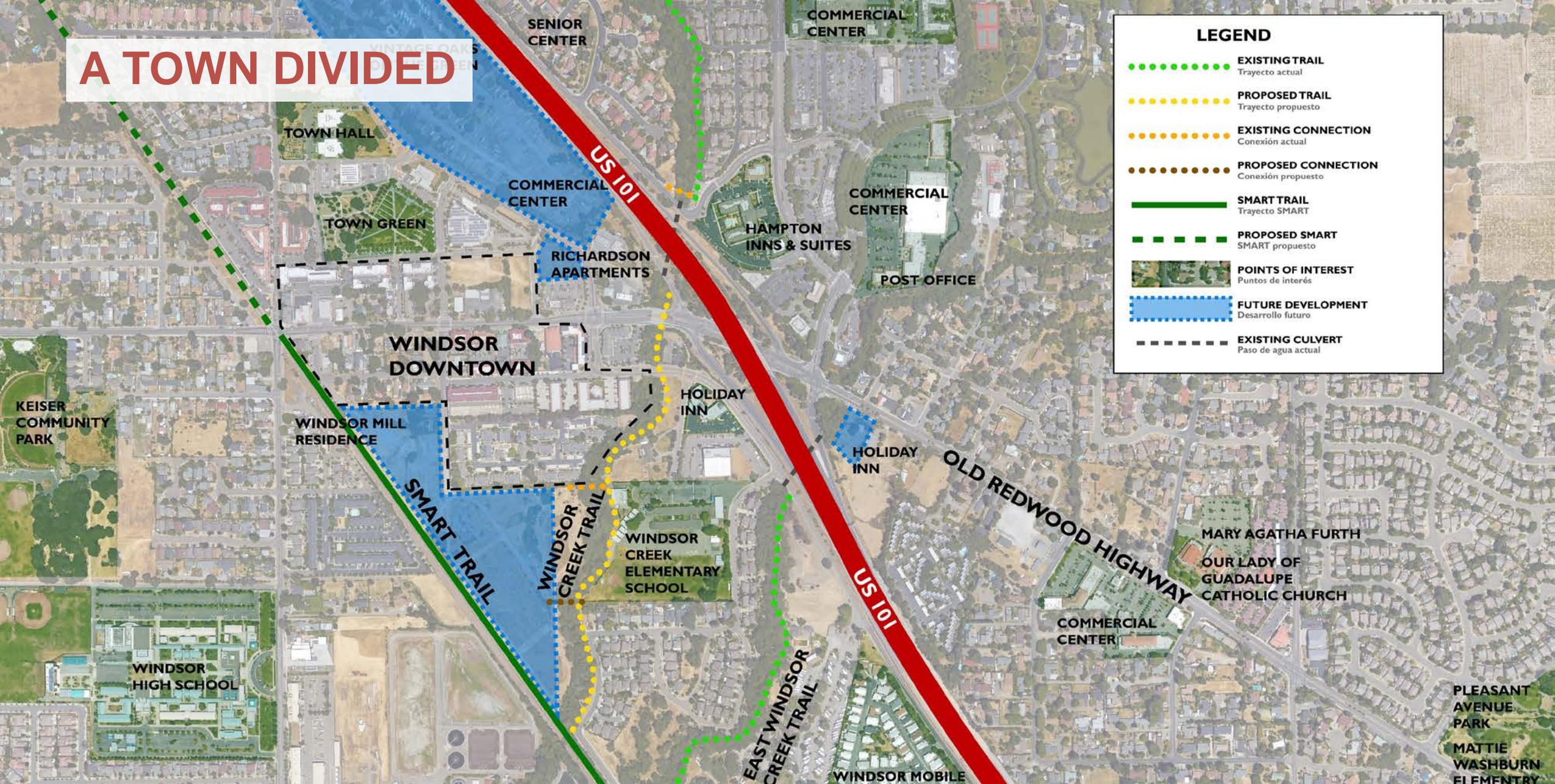
THE AVERAGE PERSON WILL LOSE 13 LBS IN THEIR FIRST YEAR OF RIDING TO WORK
Source: Outdoor Foundation, 2010

ON A ROUND TRIP OF TEN MILES, CYCLISTS SAVE AROUND \$10.00 A DAY
Source: Commute Solutions, 2011

More than three times as many new bicycles (14.9 million) are sold in the U.S. each year than cars (4.6 million)
Source: National Bicycle Dealers Association, 2010

CYCLING/WALKING PROJECTS CREATE 11-14 JOBS PER \$1 MILLION SPENT COMPARED TO JUST 7 JOBS CREATED PER \$1 MILLION SPENT ON HIGHWAY PROJECTS
Source: The Alliance for Biking & Walking Benchmarking Project.

A TOWN DIVIDED



LEGEND

- EXISTING TRAIL
Trayecto actual
- PROPOSED TRAIL
Trayecto propuesto
- EXISTING CONNECTION
Conexión actual
- PROPOSED CONNECTION
Conexión propuesto
- SMART TRAIL
Trayecto SMART
- PROPOSED SMART
SMART propuesto
- POINTS OF INTEREST
Puntos de interés
- FUTURE DEVELOPMENT
Desarrollo futuro
- EXISTING CULVERT
Paso de agua actual

OLD RED CROSSING SERVES MAJORITY OF TOWN



CONNECTING WINDSOR

EXISTING OLD REDWOOD HIGHWAY UNDERPASS



Insufficient Width for Compliant Bike Lanes

- *Caltrans Highway Design Manual 1003.1(3)*
- *AASHTO Guide to the Development of Bicycle Facilities Section 4.6.4*
- *Town of Windsor Complete Street Design Guidelines*



Insufficient Width for Compliant Shared-Use Pathway

- *Caltrans Highway Design Manual 1003.1(1)a-b*
- *AASHTO Guide to the Development of Bicycle Facilities Section 5.2.1*

OLD REDWOOD HIGHWAY UNDERPASS VICINITY



Vicinity of crossing dominated by pavement



No place to pause and view creek

OLD REDWOOD HIGHWAY BIKE/PED ISSUES

WIDE STREET

- DIFFICULT TO CROSS
- CONTRA-FLOW CYCLING

RAMP INTERSECTION GEOMETRICS

- HIGH SPEED VEHICLE TURNS
- LONG CROSSWALKS

HEAVY TRAFFIC

- DIFFICULT TO CROSS

LIMITED WIDTH AT UNDERPASS

- SUBSTANDARD BIKE LANES
- BIKES USE SIDEWALKS

CONDE

LAKEMOOD

PUBLIC ENGAGEMENT MEETINGS

- Two Public Workshops
- Hotel and Business Stakeholders
- Community Organizations
- School Superintendent, Safe Routes to School, Police and Fire
- Spanish-Speaking Community
- Gas Station Stakeholders
- Caltrans

For meeting materials and more information, visit www.ConnectingWindsor.com

1st COMMUNITY WORKSHOP



2nd COMMUNITY WORKSHOP

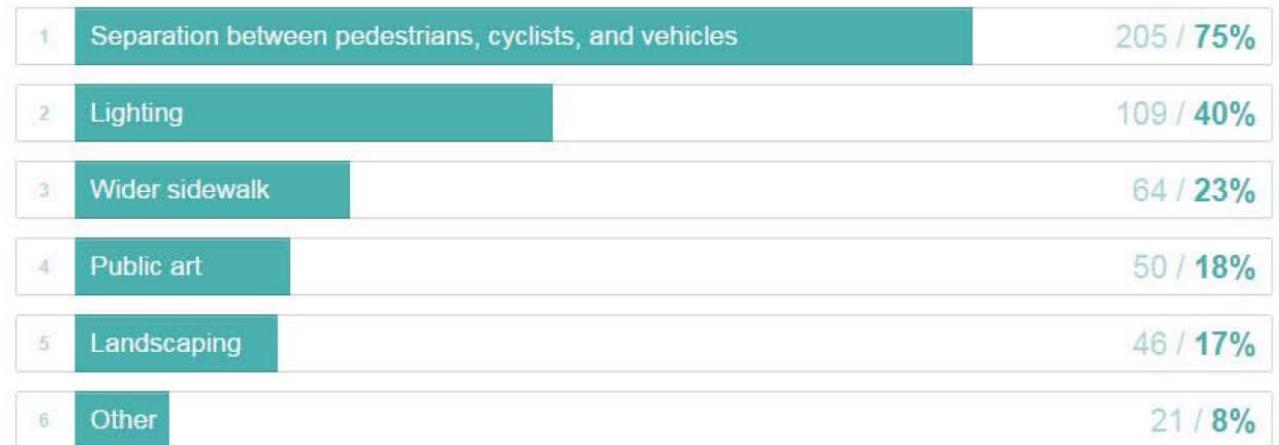


1st CONNECTING WINDSOR SURVEY (19 questions, 288 respondents)

- Most find Underpass Uncomfortable
- Half of Bikers use Sidewalk
- Top Priorities: Safety and Connectivity
- Main Safety Concern: Intersections (78%)
- Mode Separation Desired (75%)
- Additional Crossing Needed (72%)

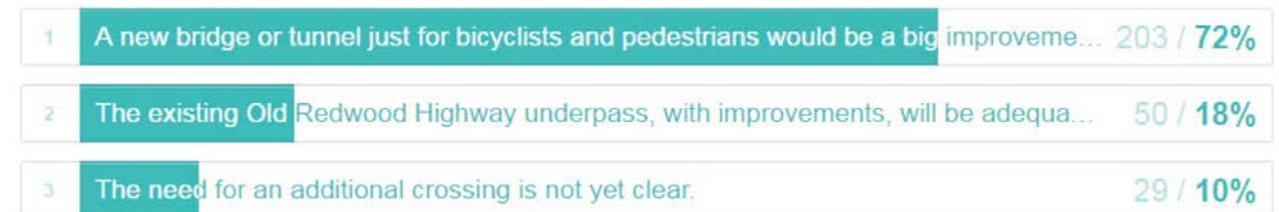
What enhancements would you most like to see in the Old Redwood Highway underpass?

274 out of 288 people answered this question



Which of the below statements most closely reflects your opinion?

282 out of 288 people answered this question



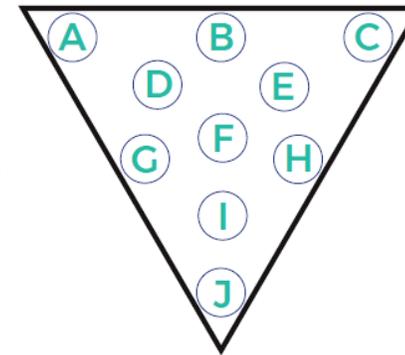
Sample questions/results from survey

2nd CONNECTING WINDSOR SURVEY (11 questions, 466 respondents)

- The project is important (80%)
- Preserving open spaces is important (77%)
- An additional crossing is needed (80%)
- 90% primarily drive, with slightly more occasional walkers than bikers
- People would walk or bike more if the project's improvements were implemented (74%)
- Main safety concerns:
 - Intersections (37%)
 - BOTH intersections and underpass space (31%)
- A third of respondents believe marginal reductions in congestion would be worth the cost of a slip ramp to US 101 North.

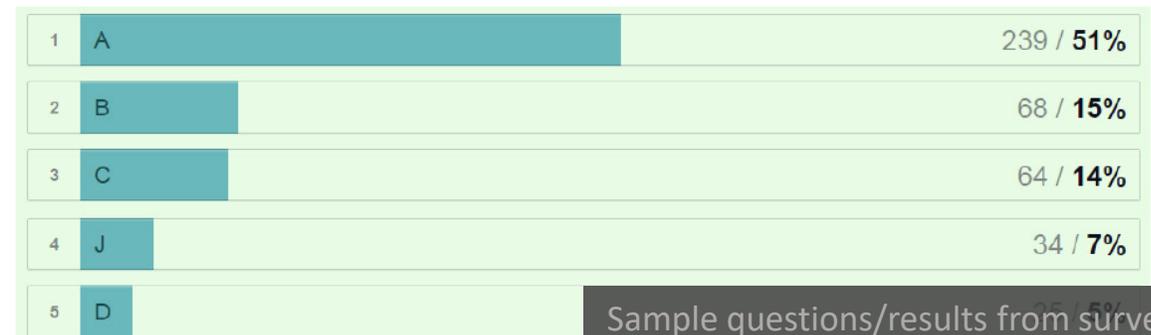
8. Please mark a dot within the triangle to best represent your point of view:

The underpass needs to be improved, but since we will never be able to eliminate the safety challenges at the freeway on and off ramps, a new car-free crossing is also needed.



An additional crossing is not needed. Improvements to the existing underpass alone would be enough to improve connectivity and safety for cyclists and pedestrians in central Windsor.

The underpass is fine the way it is now. No new crossing and no improvements are needed for crossing Highway 101 by foot or by bicycle.



Sample questions/results from survey

GOALS

- Overall Goal
 - Reconnect A Town Divided by Hwy 101
- Design Goals
 - Improve Safety for All Travel Modes
 - Encourage Cycling and Walking
 - Create Inviting Public Spaces
 - Accommodate Future Changes & Development

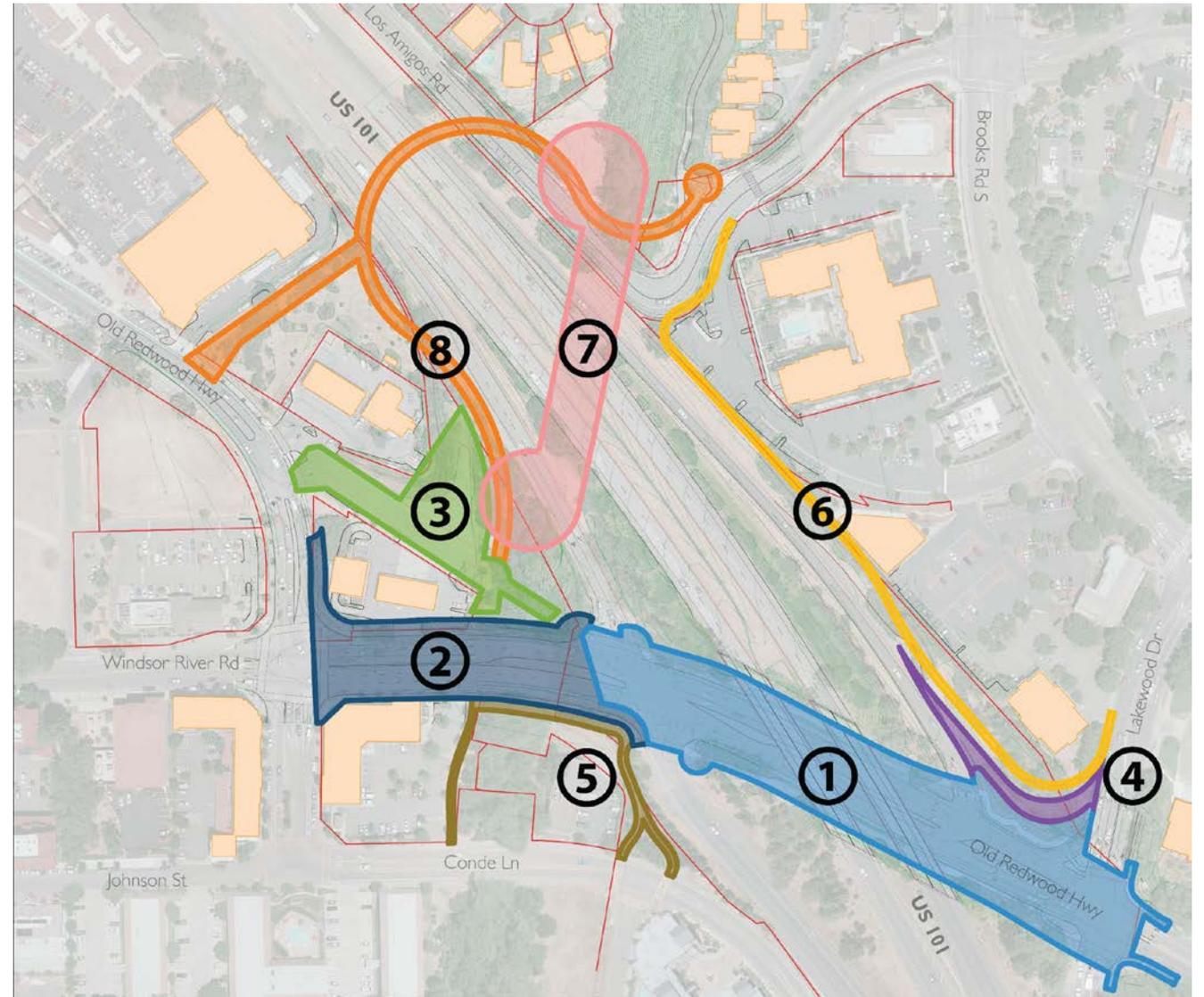


INTEGRATED STUDY

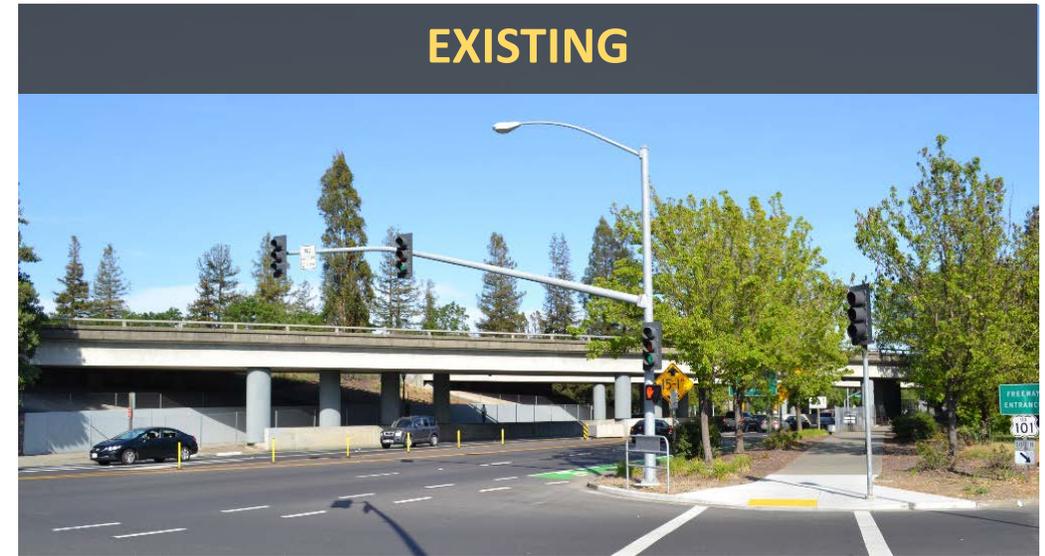
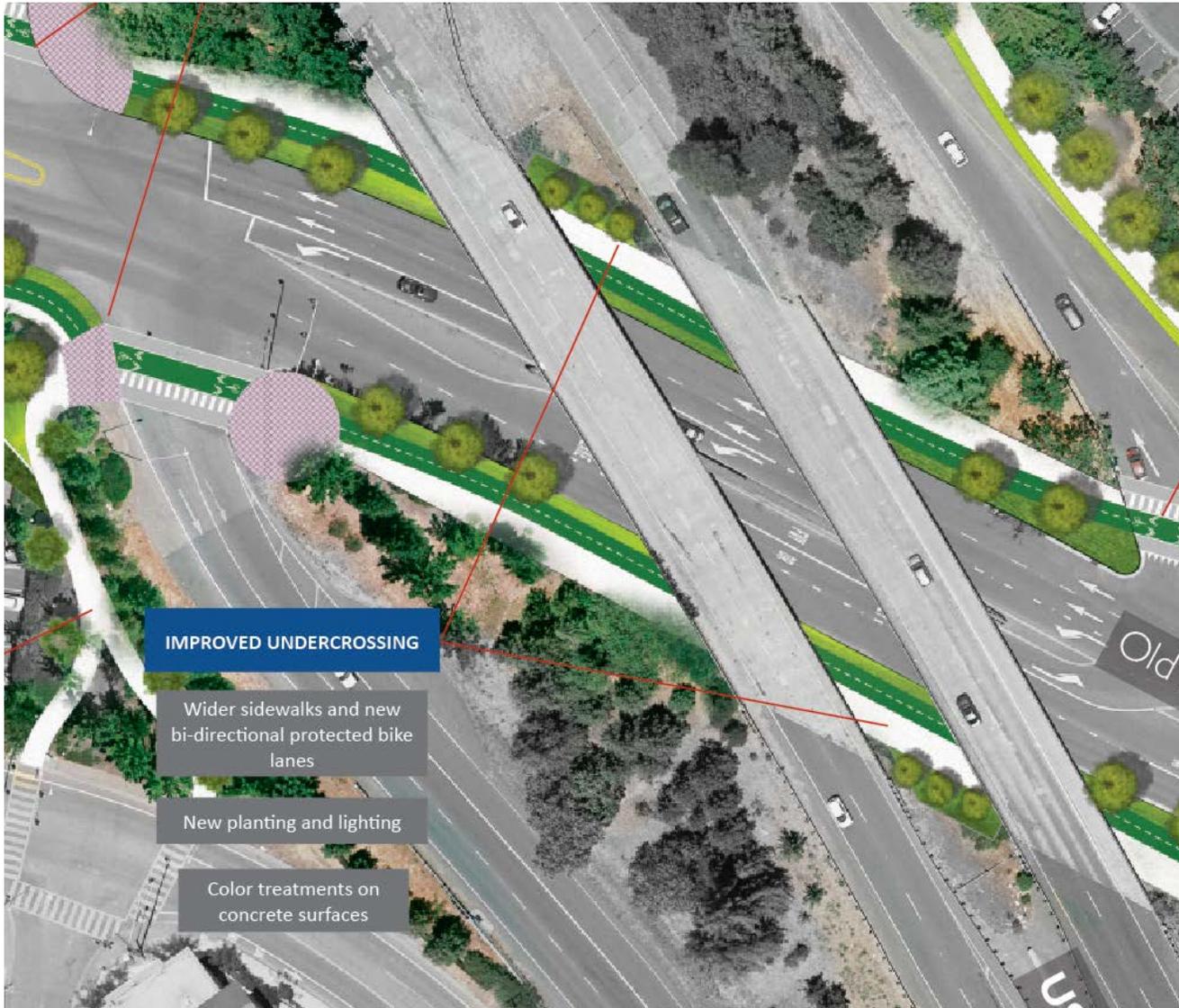
- Planning & Urban Design
 - Transportation Planning Study for Central Windsor
- Architecture
 - Underpass Beautification Study
- Engineering Studies
 1. U.S. 101 underpass geometric improvements
 2. New undercrossing
 3. New overcrossing
 4. Roadway modifications
 5. Gas station area development plan
- Public Engagement

COMPONENTS STUDIED

1. Old Redwood Highway Underpass
2. Old Redwood Highway Streetscape
3. Old Redwood Highway Promenade
4. Lakewood Slip Ramp
5. Conde Pathways
6. Lakewood-Amigos Pathway
7. New Car-Free Undercrossing
8. New Car-Free Overcrossing



BEAUTIFICATION & UNDERPASS IMPROVEMENTS



EXISTING UNDERPASS CONDITIONS



EXISTING UNDERPASS CONDITIONS



NEW TIE-BACK WALL



Protected Two-Way
Bike Lanes + 12-foot
Sidewalk

NEW TIE-BACK WALL

Protected Two-Way
Bike Lanes + 12-foot
Sidewalk

PLACEMAKING



*Windsor
Town Green*

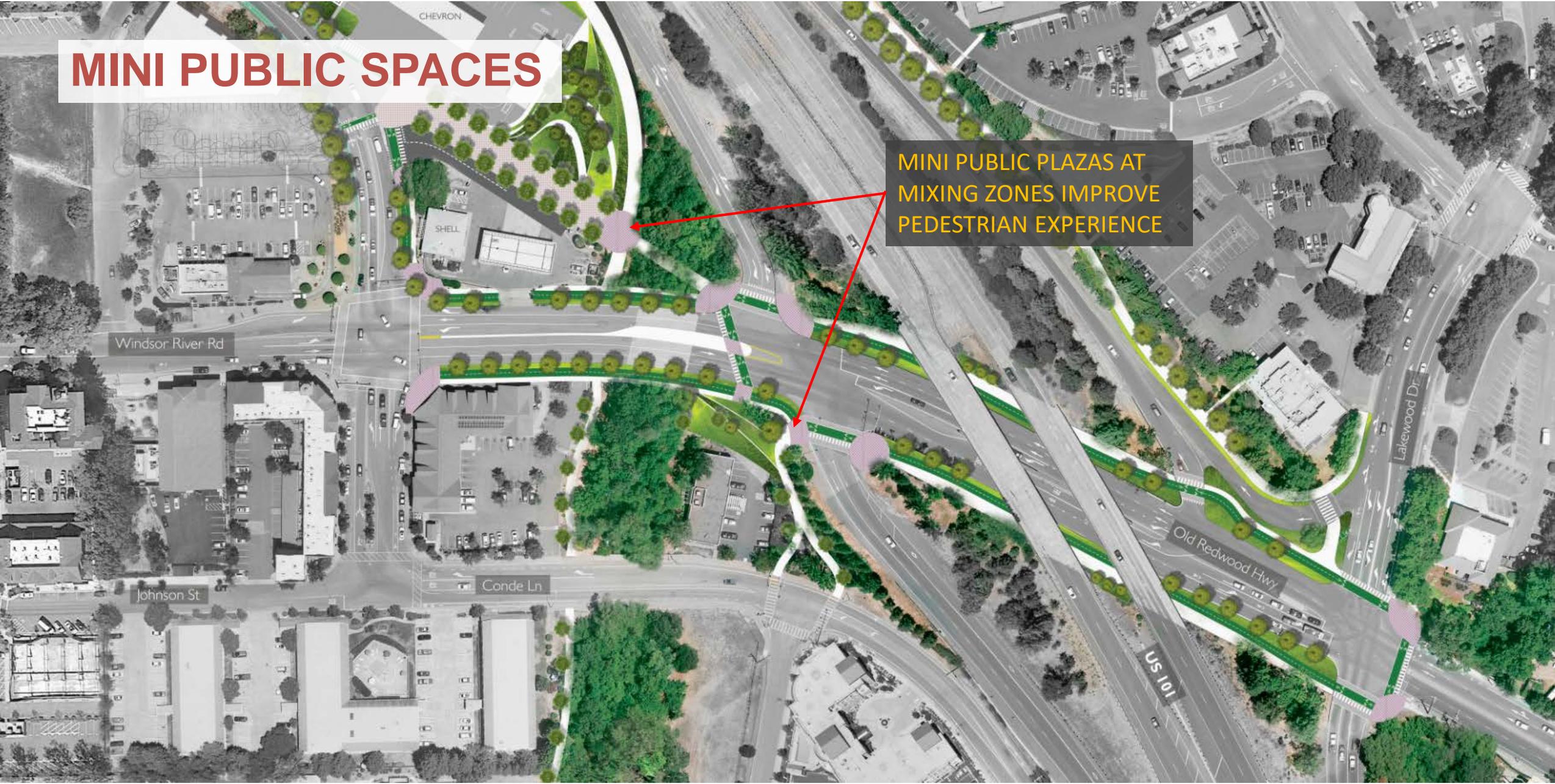


*Broadway,
Manhattan*

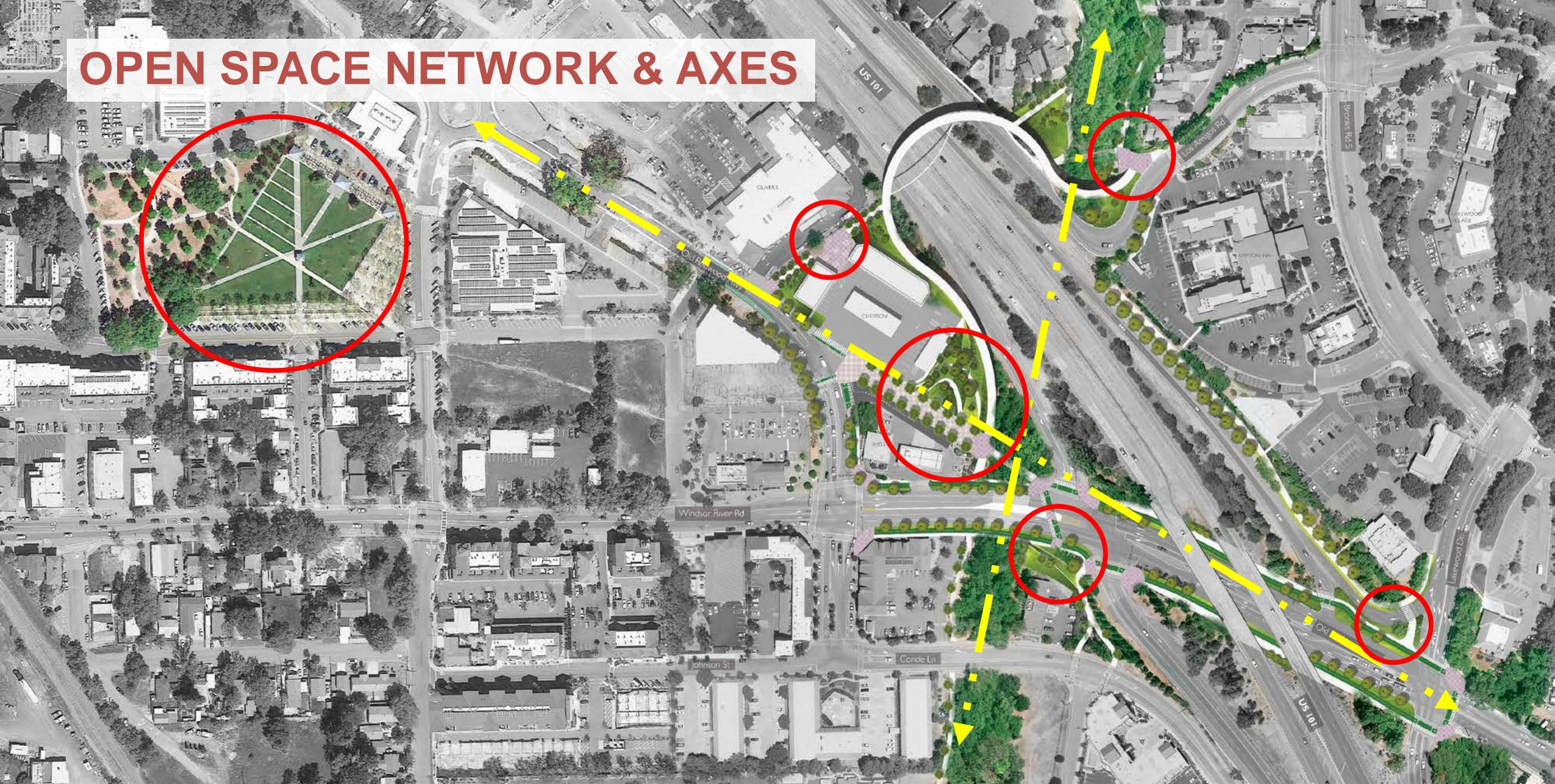


MINI PUBLIC SPACES

MINI PUBLIC PLAZAS AT MIXING ZONES IMPROVE PEDESTRIAN EXPERIENCE

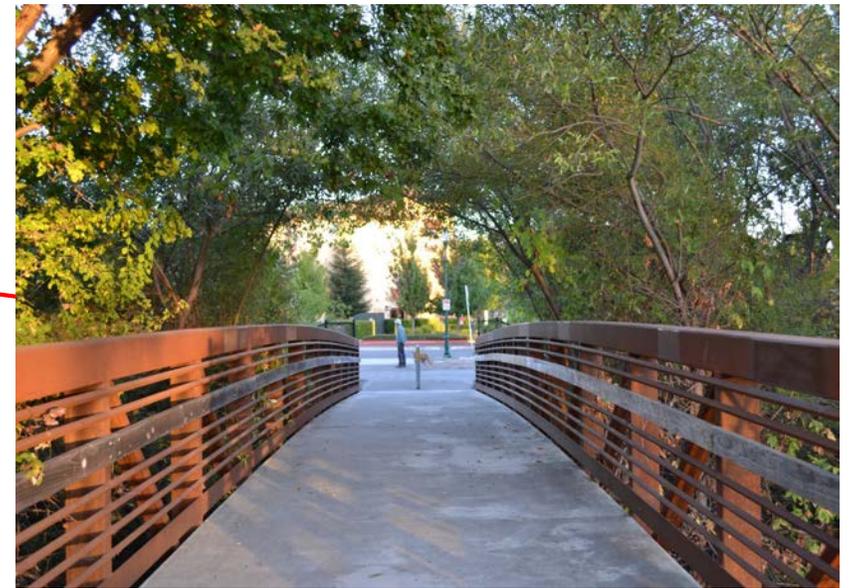
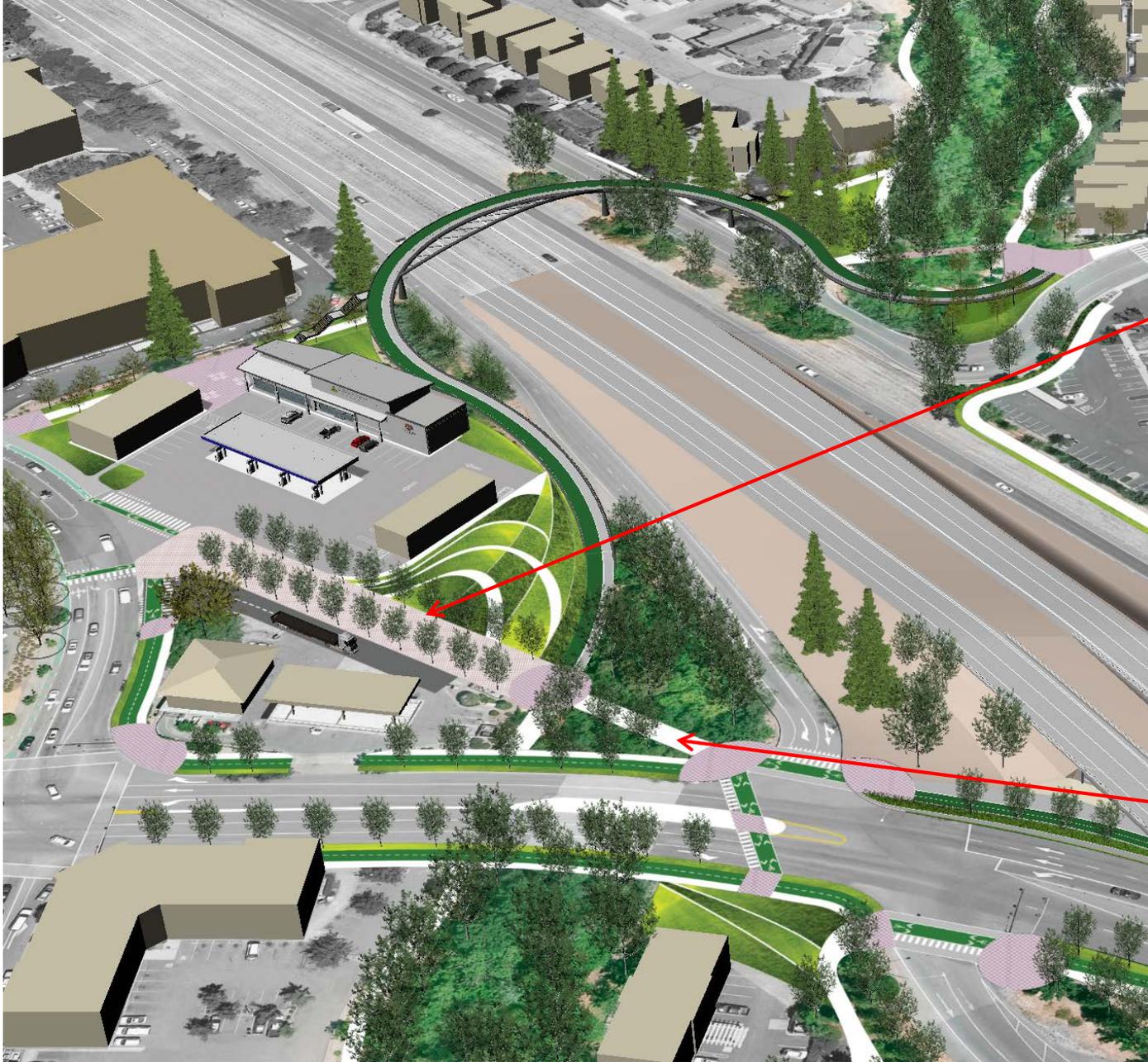


OPEN SPACE NETWORK & AXES

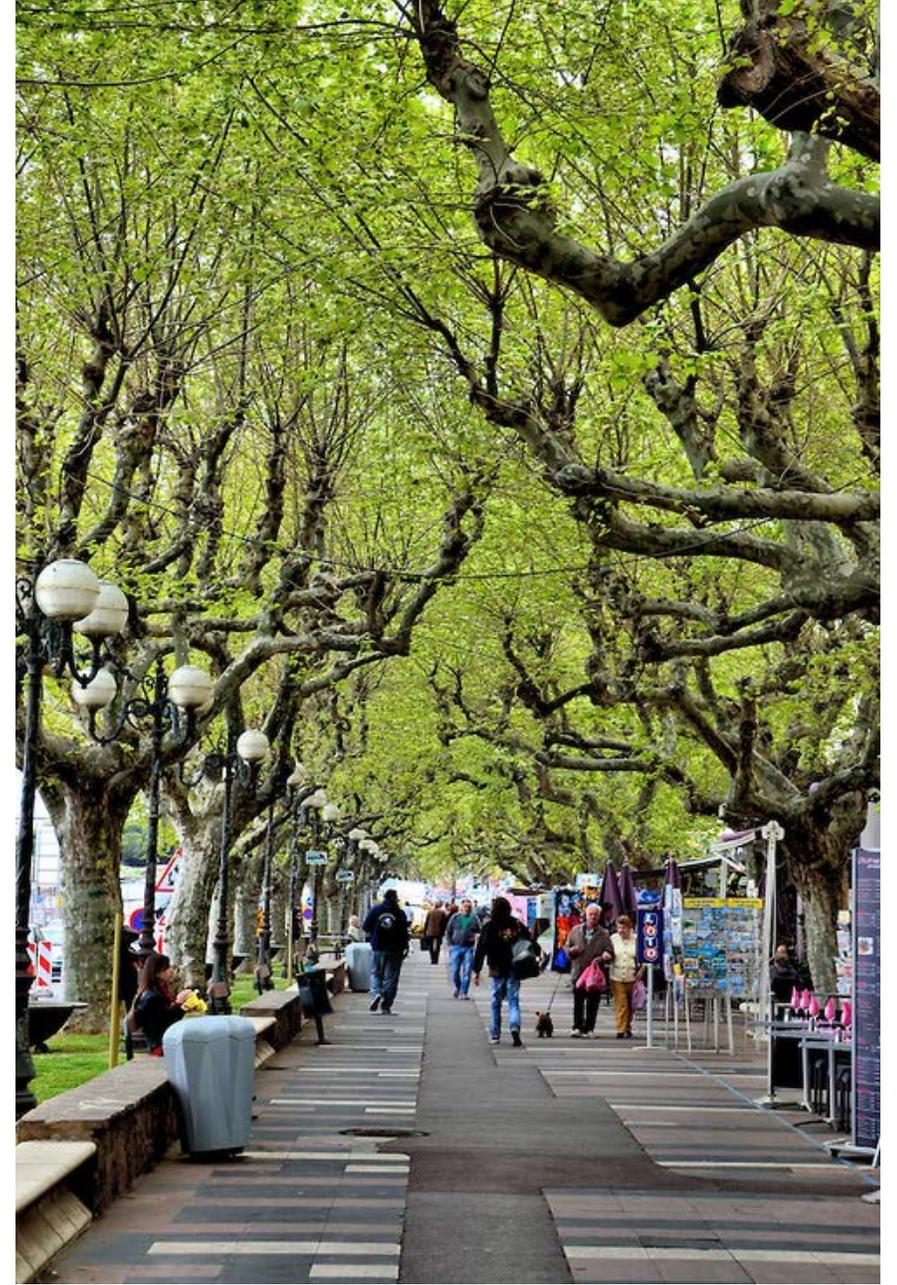


CENTRAL OPEN SPACE & PROMENADE





CONNECTING WINDSOR

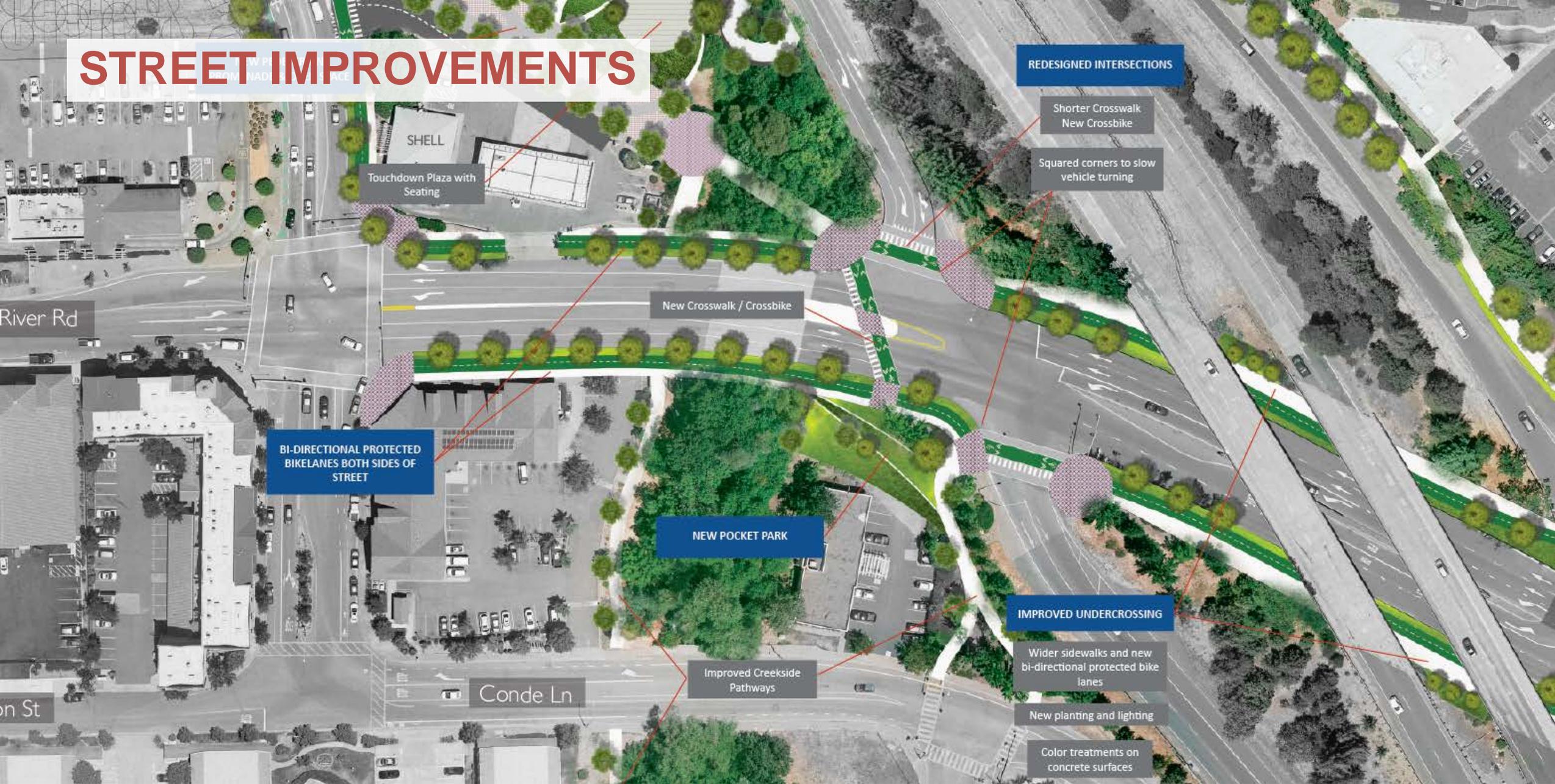


CONNECTING WINDSOR



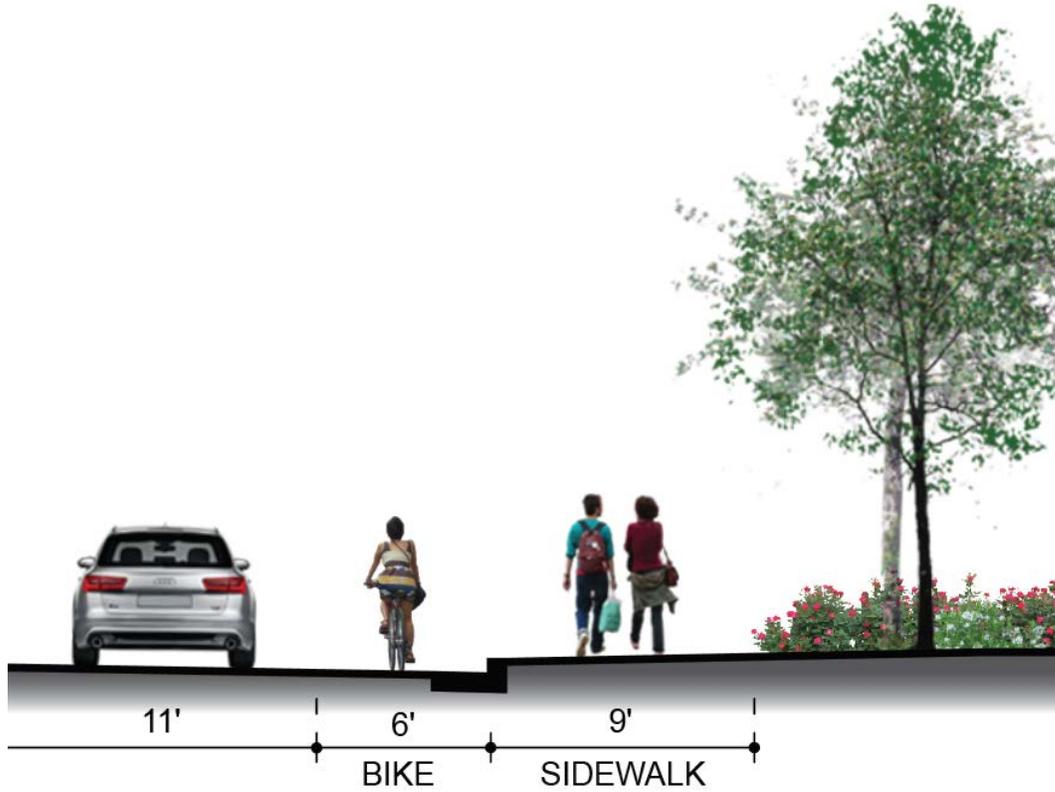
CONNECTING WINDSOR

STREET IMPROVEMENTS

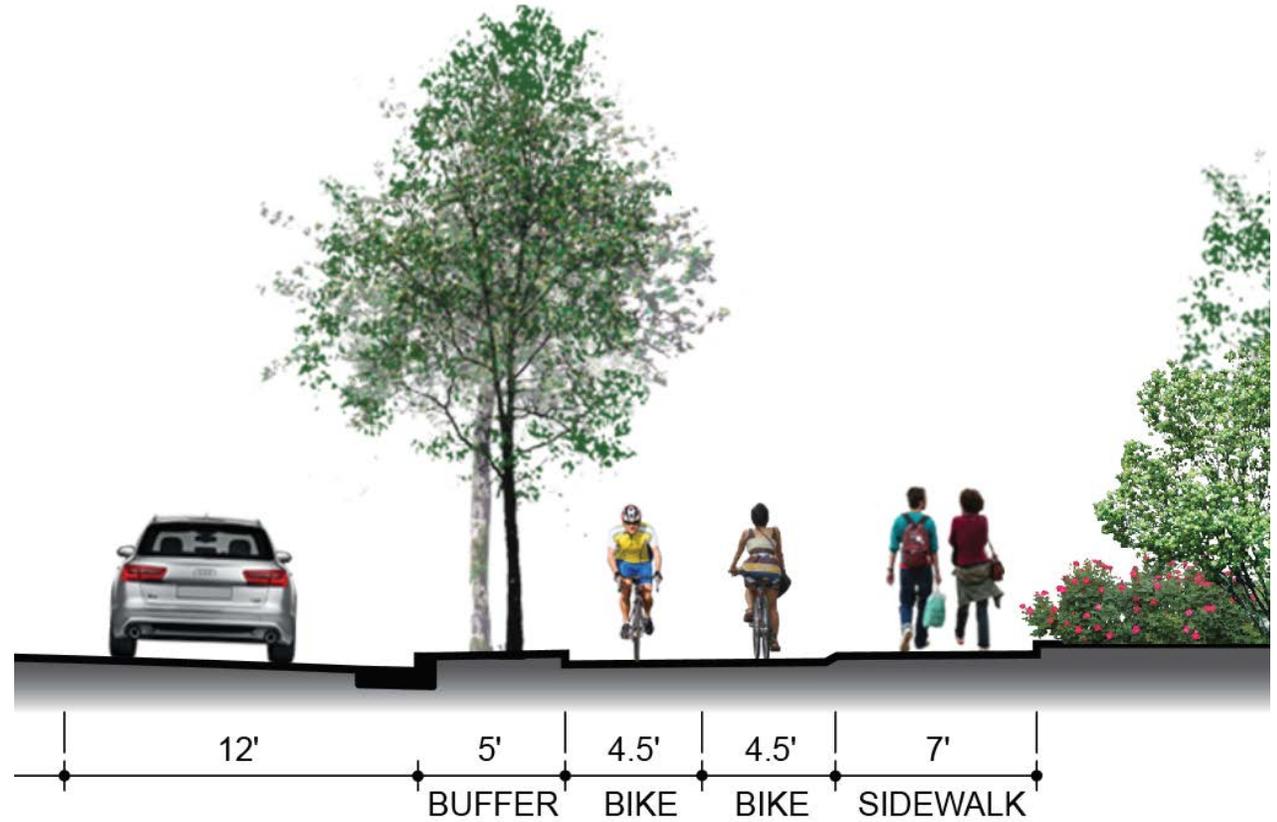


CONNECTING WINDSOR

PROTECTED BIKE LANES



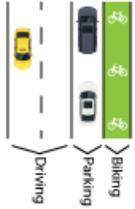
EXISTING



PROPOSED

WHY BUILD PROTECTED BIKE LANES?

WHAT ARE THEY?



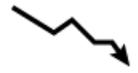
Protected bike lanes put a barrier between drivers and bike riders. The barrier can be parked cars, plastic posts, or planters. They are popular in cities with high amounts of bike riders for everyday use.



GOOD FOR SAFETY

89%

fewer injuries among bike riders on streets with protected bike lanes.⁵



Bike- and pedestrian-friendly street design leads to less collisions, even when there are more people out!⁶



DRIVERS don't have to worry about unexpected bike maneuvers.



PEDESTRIANS don't have to worry about bike riders on the sidewalks.

GOOD FOR LAWFULNESS



In Chicago, protected bike lanes have resulted in a 161% increase in the number of bike riders obeying the stoplight.⁷

GOOD FOR EVERYONE

71%

of Americans have expressed interest in riding a bike more often, but find it unsafe.⁸ *Are you one of them?*

LESS

Each bike on the road is one less car in traffic, causes less pollution, less wear on the road (and therefore less taxpayer-funded maintenance), and creates a healthier population.

**LIKE PROTECTED BIKE LANES?
TELL YOUR LOCAL ELECTED OFFICIALS!**

GOOD FOR BUSINESS

↑49% 9th Ave in New York City saw a increase in business after protected bike lanes were installed.¹ Nearby streets only saw a 3% increase.

↑55% More bike traffic on Kinzie St in Chicago after a protected bike lane was installed.²

A Portland study found bike riders will *go out of their way* to a street with good bike infrastructure. That's more business exposure.³



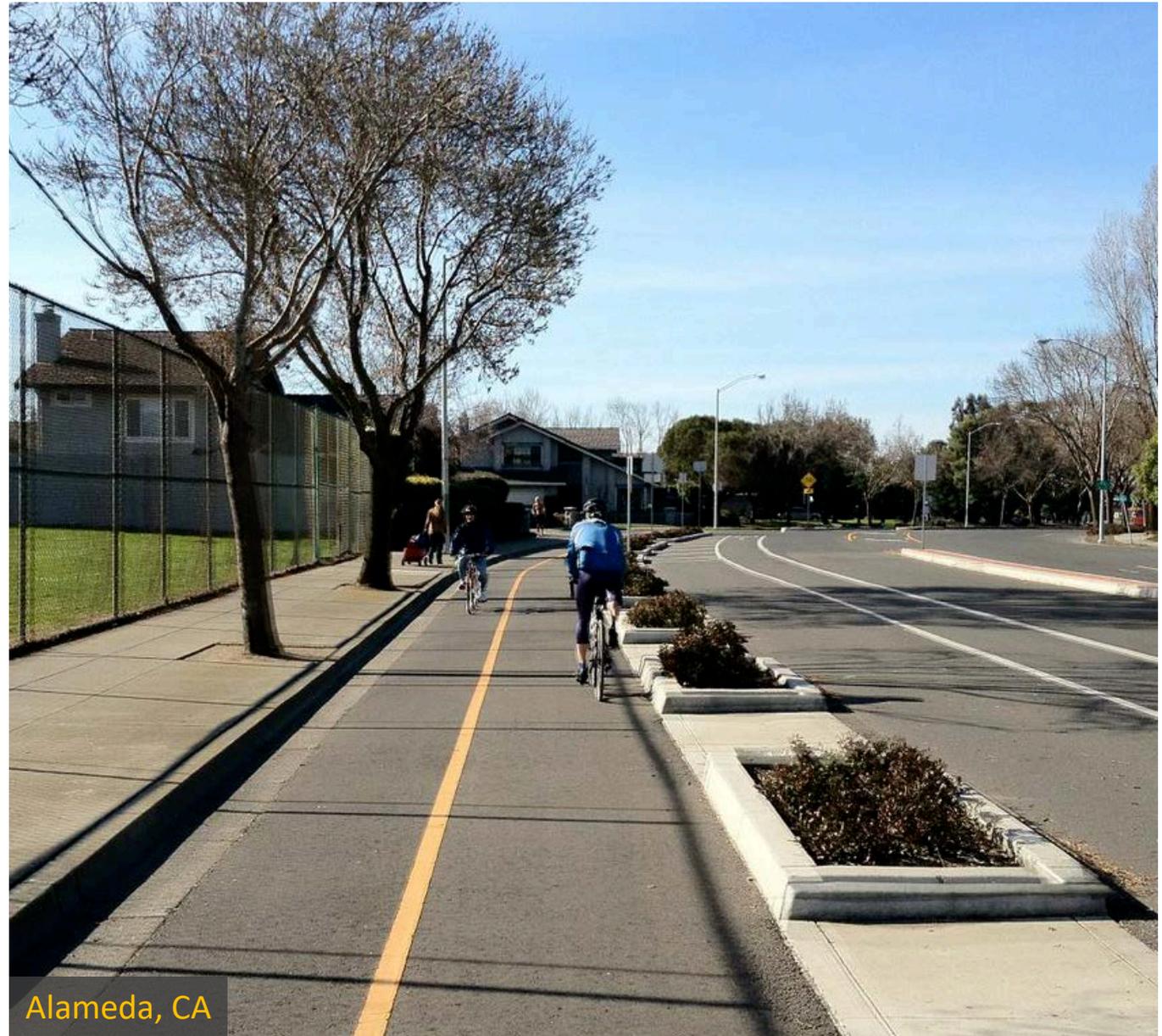
Pedestrians and bike riders in Toronto **SPENT THE MOST MONEY** and visited stores more often.

Maybe because it costs less to walk or bike?

Transitized.com

1. NYC DOT, Measuring the Street: New Metrics for 21st Century Streets
2. CDOT, http://www.cityofchicago.org/city/en/depts/cdot/provdrs/bike/news/2011/sep/initial_findings_kinzie_street_protected_bike_lane.html
3. Jennifer Dill, Bicycling for Transportation and Health: The Role of Infrastructure, <http://www.palgrave-journals.com/pal/journal/v50/n51/full/jph2010855a.html>
4. The Clean Air Partnership, 2009, Bike Lanes, On-Street Parking and Business: A Study of Bloor Street in Toronto's Annex Neighbourhood

5. Kay Teschke, M. Anne Harris, et. al. Route Infrastructure and the Risk of Injuries to Bicyclists: A Case-Crossover Study.
6. <http://injury-prevention.bmj.com/content/9/3/205.abstract>
7. Chicago Tribune, City says Dearborn bike signs keeping cyclists in line, June 10, 2013.
8. NHTSA, Volume II: Findings Report National Survey of Bicyclist and Pedestrian Attitudes and Behavior, 2008



Alameda, CA

CAR-FREE UNDERCROSSING STUDY PROCESS

- Many alternatives studied:
 - Existing culvert
 - New tunnel and raised roadways
 - Open-air underpass alongside Windsor Creek
- Recommended alternative provides Windsor Creek experience

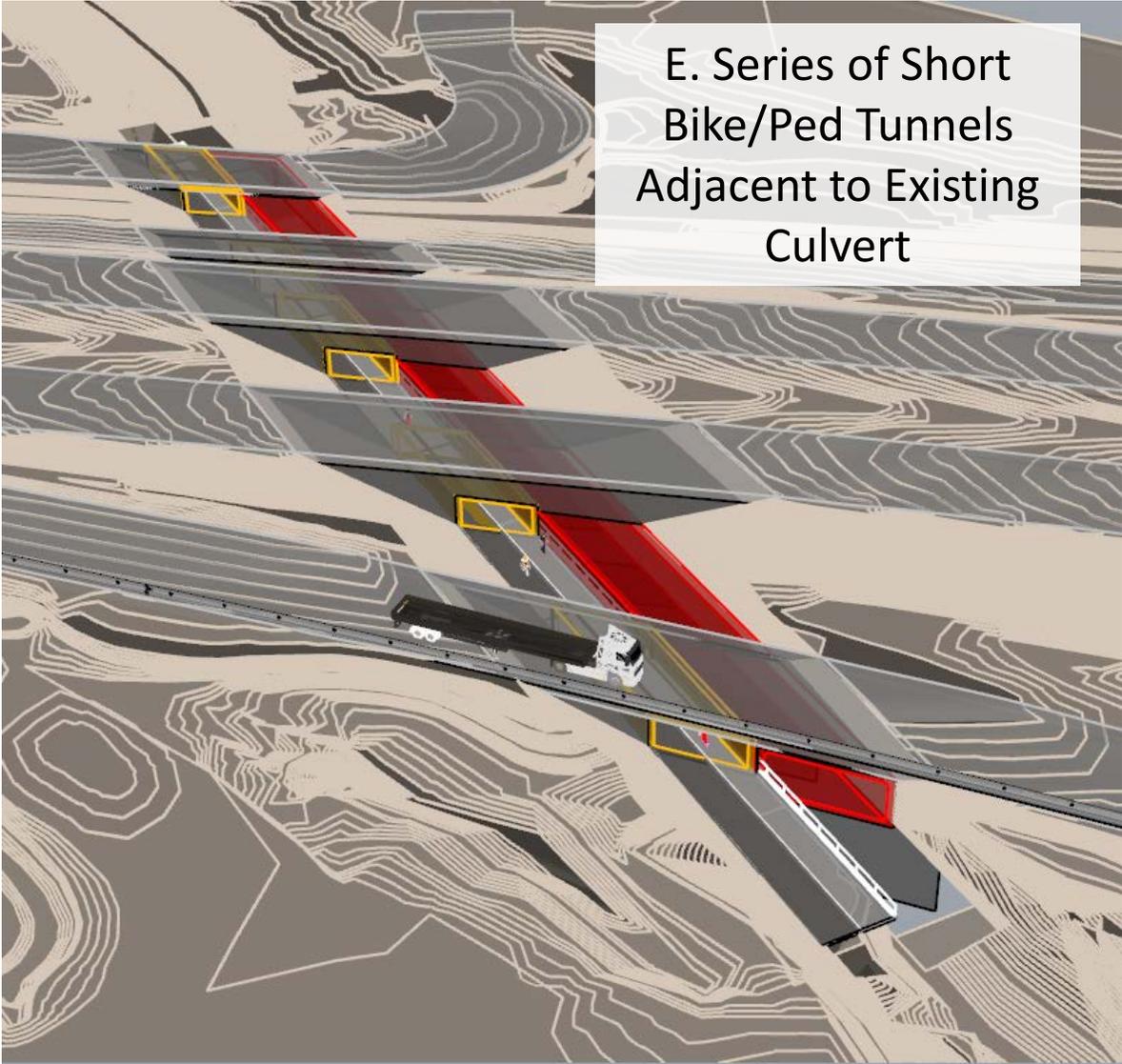


CAR-FREE UNDERCROSSING ALTERNATIVES

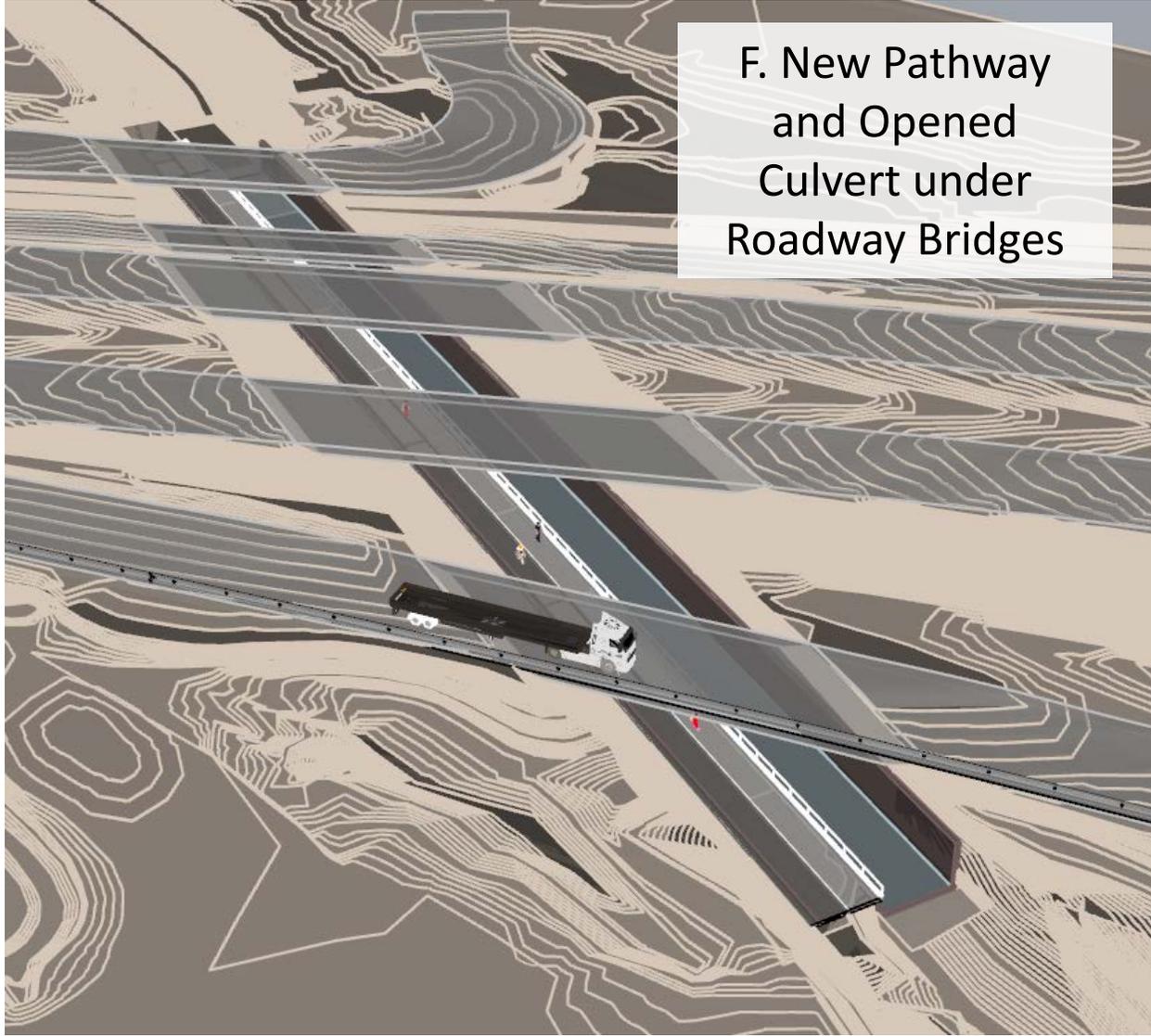
Alternative	A	B	C	D	E	F
Description	Add Pathway within Existing Culvert	New Tunnel Under Raised SB Ramp, Freeway, and NB Ramp	New Tunnel Under Freeway Only; Crosswalks at Ramps	Raised Freeway and Ramps	Series of Short Bike/Ped Tunnels Adjacent to Existing Culvert	New Pathway and Opened Culvert under Roadway Bridges
Geometry	400' long tunnel	300' long tunnel	155' long tunnel	300' wide open space under freeway	Five 25' to 50' long tunnels	Five 25' to 50' long overpasses
User Experience	Challenging	Challenging	Challenging	Excellent	Good	Very Good
Safety	Good	Good	Poor	Good	Good	Good
Security	Poor	Poor	Poor	Good	Good	Good
Flooding Potential*	Frequent	Negligible	Negligible	Negligible	50-100 year frequency	50-100 year frequency
Top of Bike/Ped Traveled Way (elev.)	107'	119'	119'	119'	109'	109'
Environmental Approval	Very Challenging	Somewhat Challenging	No Significant Issues Anticipated	Very Challenging	Somewhat Challenging	Somewhat Challenging
Caltrans Approval	Very Challenging	Challenging	Very Unlikely	Very Challenging	Challenging	Challenging
Estimated Construction Cost	\$2M Range	\$20M Range	\$10-15M Range	Very High	\$7.5M Range	\$16M Range

*100-year flood level elev. at 113'

UNDERCROSSING ALTERNATIVES E & F



E. Series of Short
Bike/Ped Tunnels
Adjacent to Existing
Culvert



F. New Pathway
and Opened
Culvert under
Roadway Bridges

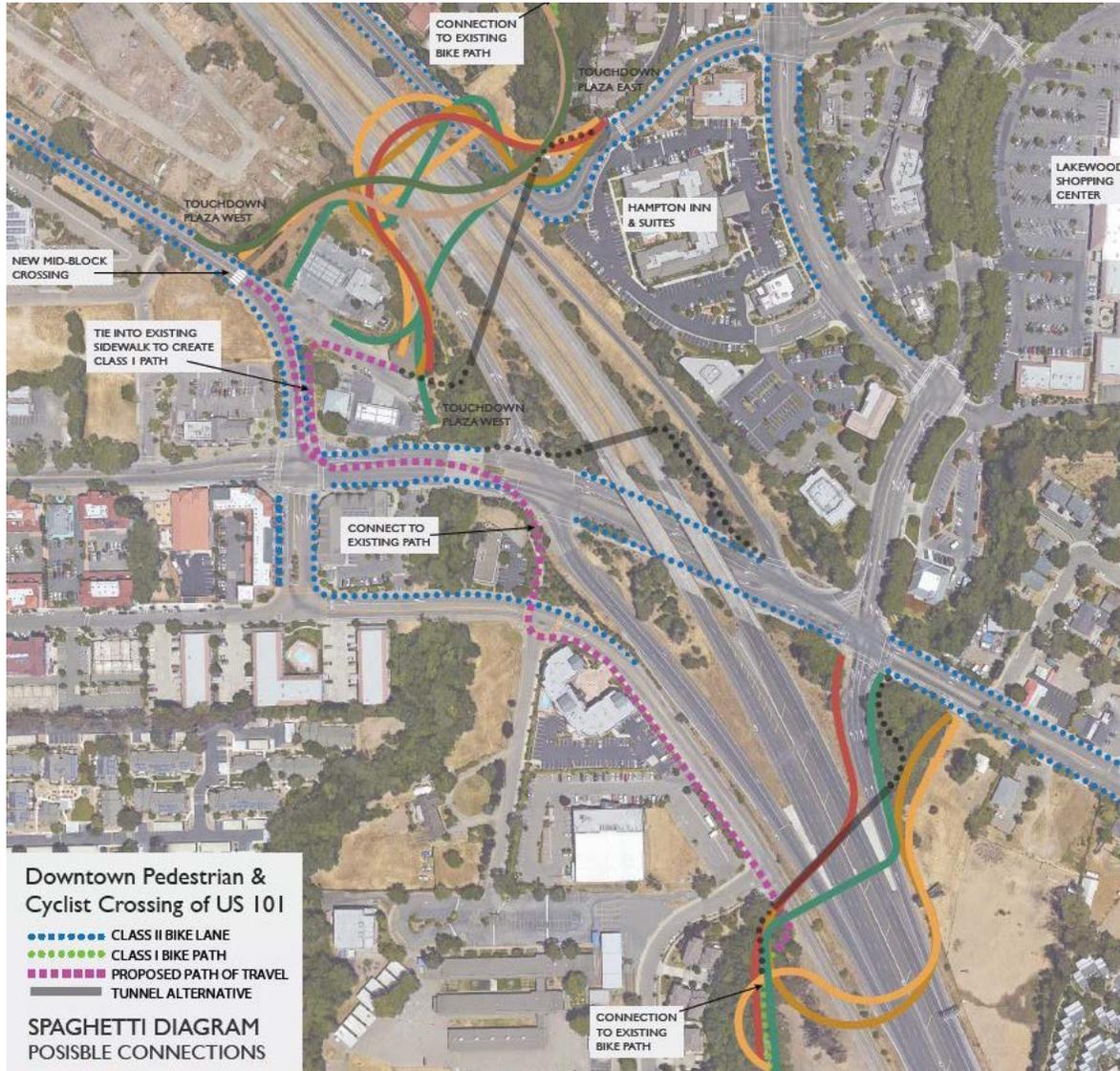
UNDERCROSSING ALTERNATIVE E

Series of Short Bike/Ped
Tunnels Adjacent to
Existing Culvert

UNDERCROSSING ALTERNATIVE F

New Pathway and
Opened Culvert
under Roadway
Bridges

OVERCROSSING STUDY PROCESS



CONNECTING WINDSOR

OVERCROSSING ALTERNATIVES COMPARISON

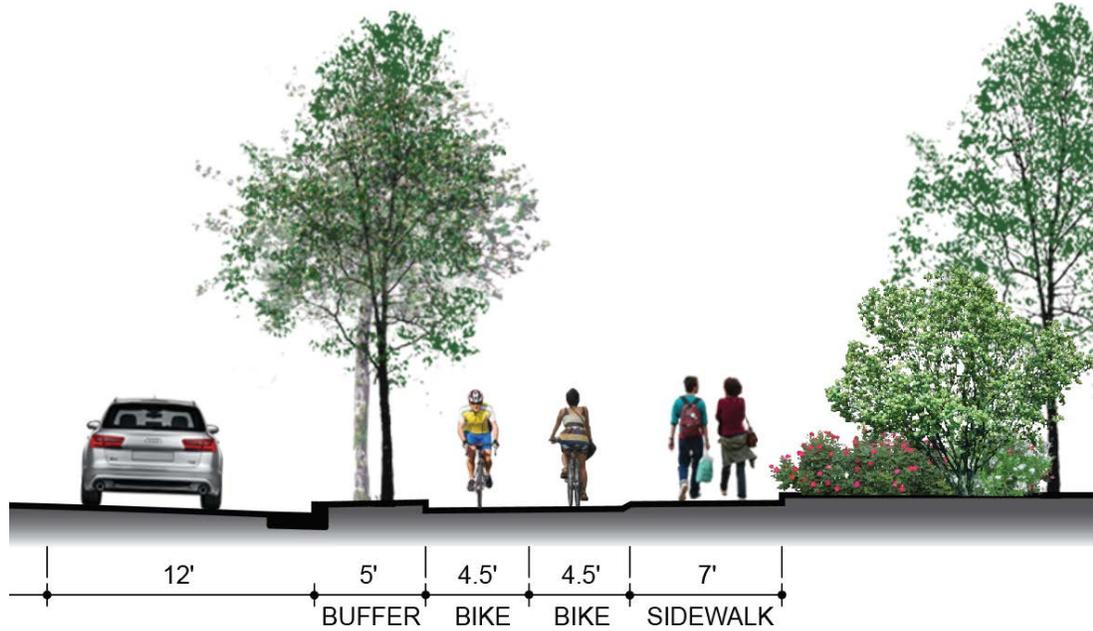
Input rating scores of 0-5 in YELLOW cells.
Total design score will be automatically calculated and displayed in red cell.

Alignment	1	2	3	4	5	6	7	8	9 Recommended Alignment		
Key Feature & Issues	<ul style="list-style-type: none"> Tight turns impact safety and visibility East TD behind homes and not on main road Biased wayfinding at west TD Provides less options to destinations Existing bridge remains in place 	<ul style="list-style-type: none"> Loop and tight turns impact safety and visibility Neutral wayfinding at TDs Existing bridge remains in place 	<ul style="list-style-type: none"> Good form for safety and visibility East TD behind homes and not on main road TDs tie into ped corridor along creek & ORH Existing bridge remains in place 	<ul style="list-style-type: none"> TDs tie into ped corridor along creek & ORH Biased wayfinding at west TD Requires relocation of existing bridge 	<ul style="list-style-type: none"> Tight turn impacts safety and visibility West TD ties into ped corridor along ORH Biased wayfinding at west TD West TD impacts driveway of Chevron Requires relocation of existing bridge 	<ul style="list-style-type: none"> Tight turn impacts safety and visibility Biased wayfinding at east TD West TD ties into corridor along creek & ORH Existing bridge remains in place 	<ul style="list-style-type: none"> Good form for safety and visibility East TD impacts driveway of Hampton Inn TDs tie into ped corridor along creek & ORH Existing bridge remains in place 	<ul style="list-style-type: none"> Good form for safety and visibility East TD impacts driveway of Hampton Inn Requires realignment of Los Amigos Requires relocation of existing bridge 	<ul style="list-style-type: none"> Good form for safety and visibility TDs tie into ped corridor along creek & ORH Requires relocation of existing bridge 		
Design Score	1320	1395	1820	1515	1340	1880	1952.5	1812.5	2145		
1) Elegance	weight score		weight score		weight score		weight score		weight score		
Landmark Potential	50	4	200	3	150	4	200	3	150	5	250
Simplicity of Geometry/Strength of Concept	50	3	150	2	100	4	200	3.5	175	4.5	225
sub-total			350		250		400		325		475
2) Connection	weight score		weight score		weight score		weight score		weight score		
Wayfinding (Easy to spot / See from distance)	40	3	120	5	200	3	120	3	120	5	200
Total Length (touchdown to touchdown)	30	0	0	0	0	0	0	0	0	0	0
Multiple Routes Served (getting to touchdown is not circuitous, opportunities for alternate shortcuts)	30	2	60	4.5	135	3	90	5	150	5	150
sub-total			180		335		210		270		350
3) Safety & Experience	weight score		weight score		weight score		weight score		weight score		
Safe Geometry (Curves, Sightlines, Lengths, and Grades Ideal For Safety)	60	1	60	1	60	5	300	4	240	2.5	150
Aesthetics & Convenience (views, ease of use, interactions with nature, etc.)	40	3	120	3	120	5	200	3	120	5	200
sub-total			180		180		500		360		460
4) Adjacency	weight score		weight score		weight score		weight score		weight score		
Compatibility with existing uses (mixed functional, noise, etc.)	65	3	195	2	130	3	195	1	65	3.5	227.5
Right-of-way Acquisition	35	4	140	5	175	4	140	3	105	4	140
sub-total			335		305		340		170		407.5
5) Feasibility	weight score		weight score		weight score		weight score		weight score		
Cost	50	3	150	3	150	3	150	2	100	3	150
Conflicts (utilities, trees, cultural, etc.)	25	2	50	4	100	2	50	2	50	1	50
Constructibility	25	2	50	3	75	2	50	4	100	4	100
sub-total			275		325		250		250		425



CONNECTING WINDSOR





CONNECTING WINDSOR



THANK YOU!



STEVEN GROVER & ASSOCIATES 



moffatt & nichol

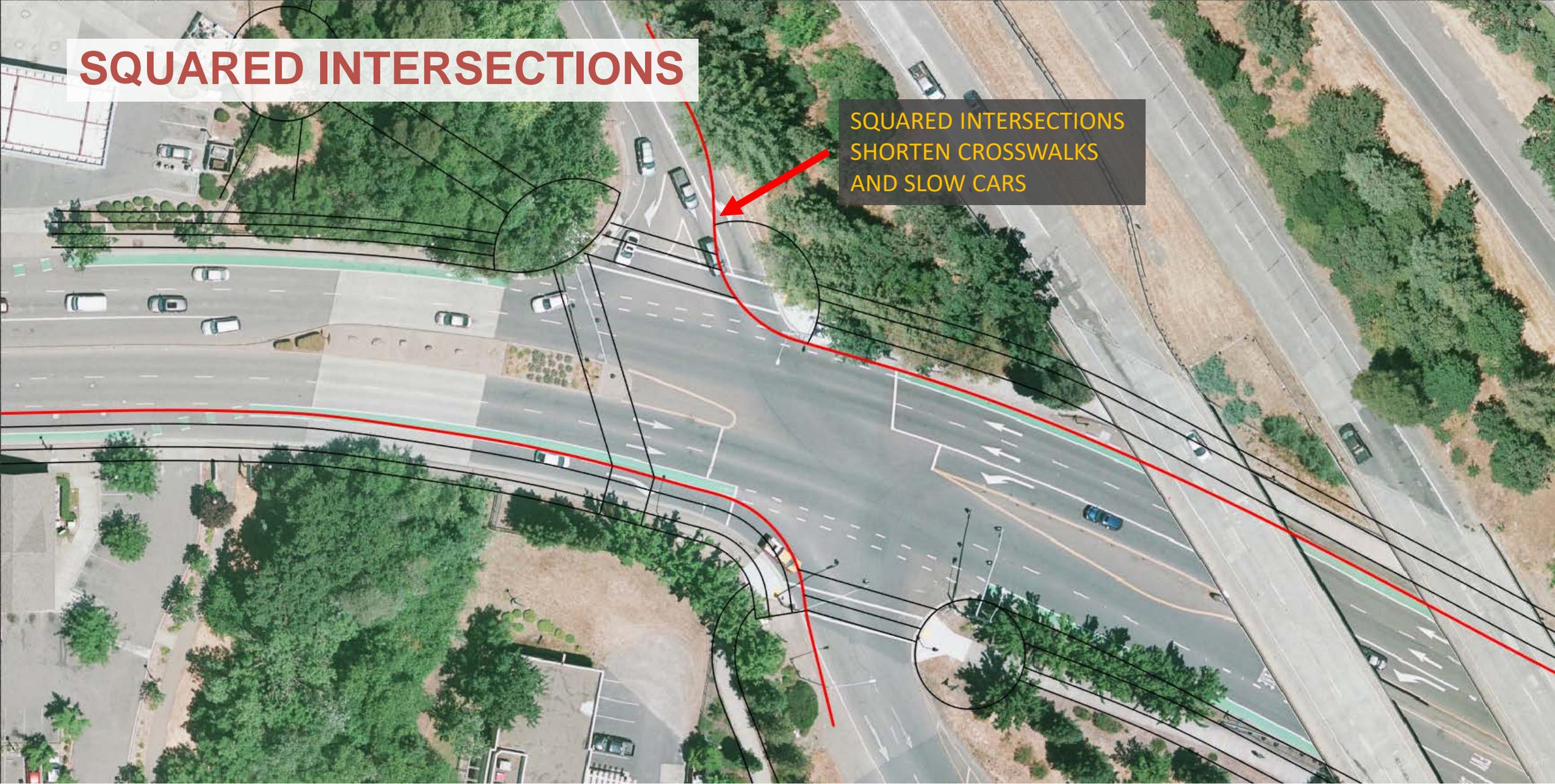
BACKUP SLIDES FOR Q&A



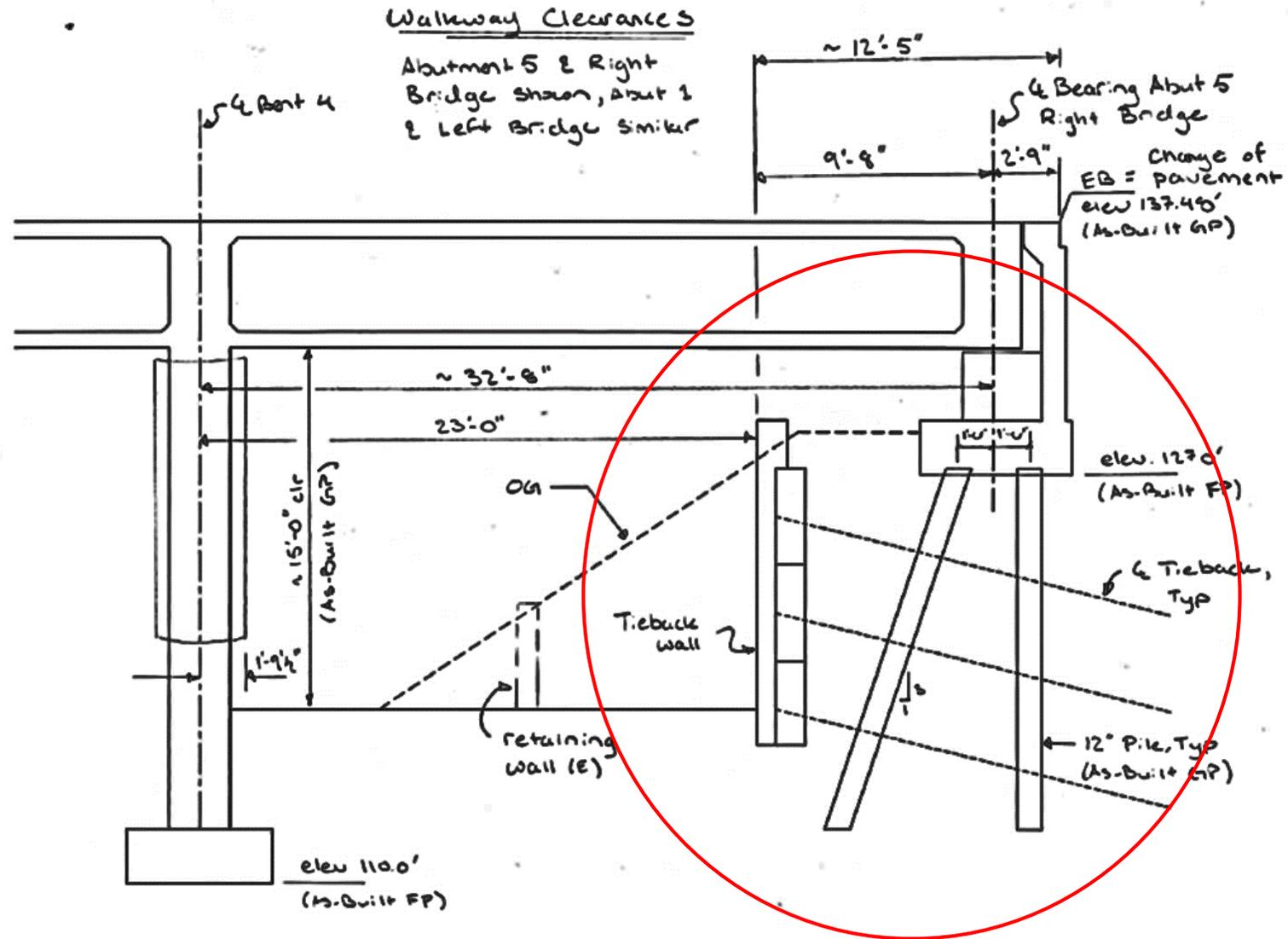
CONNECTING WINDSOR

SQUARED INTERSECTIONS

SQUARED INTERSECTIONS
SHORTEN CROSSWALKS
AND SLOW CARS



NEW TIE-BACK WALL

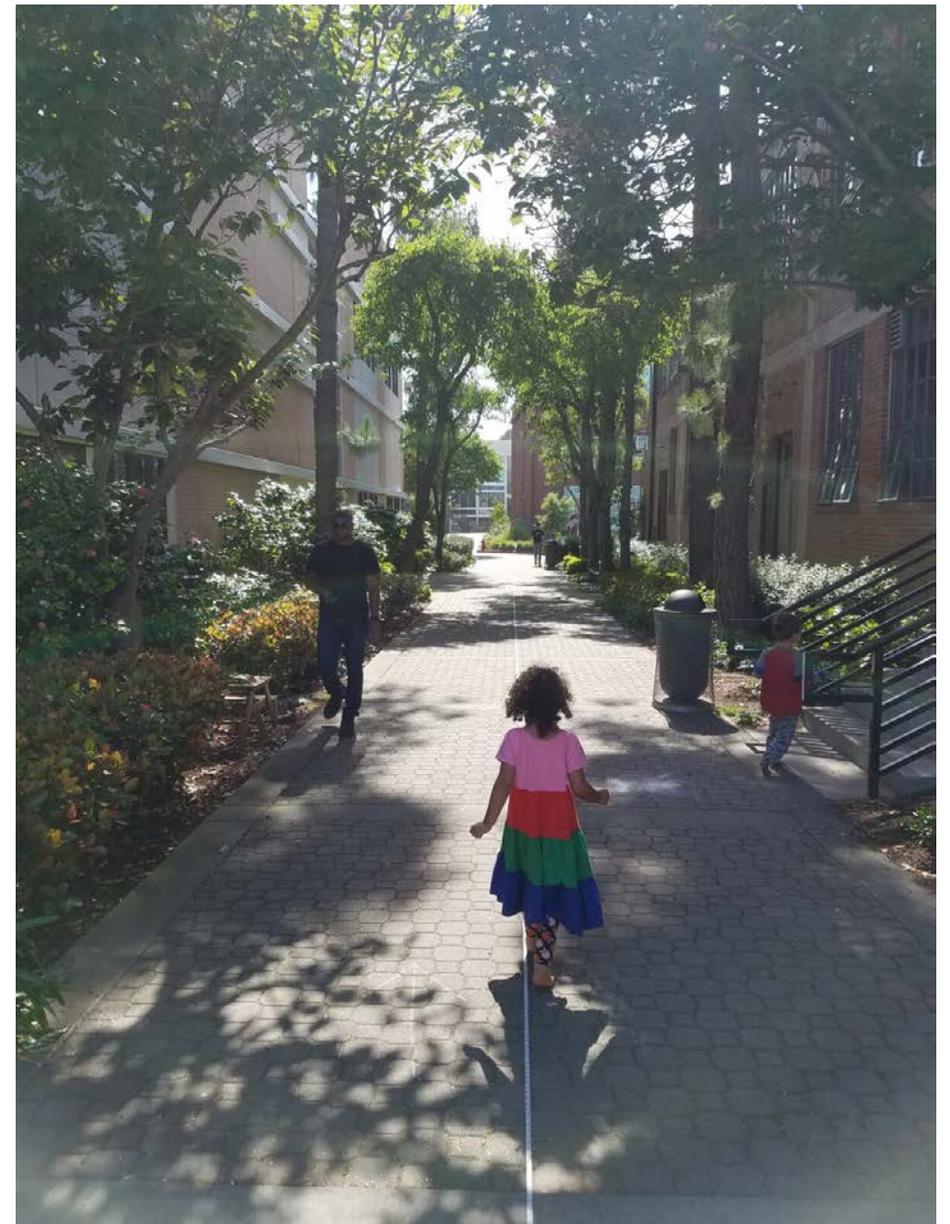
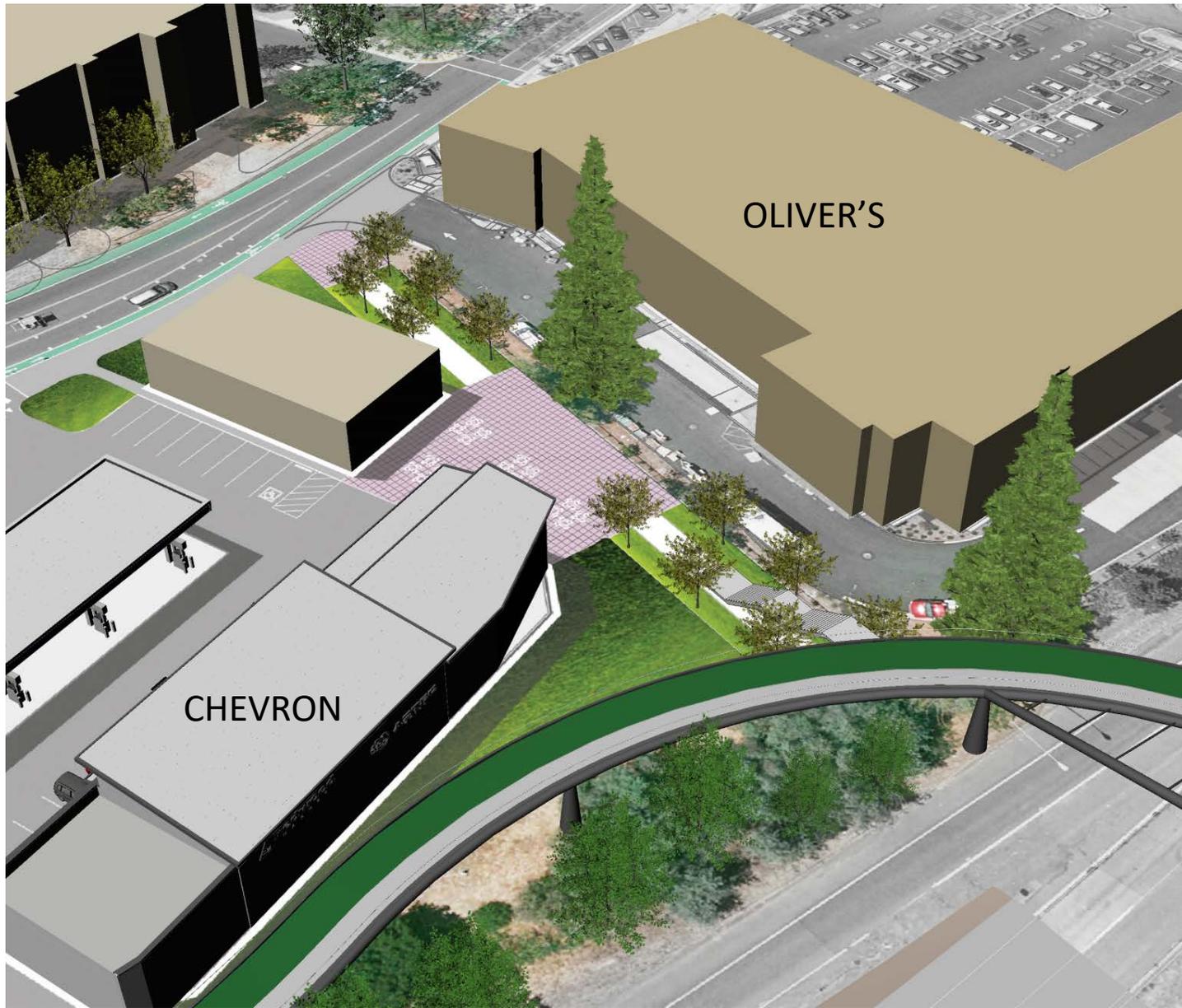




CONNECTING WINDSOR



CONNECTING WINDSOR



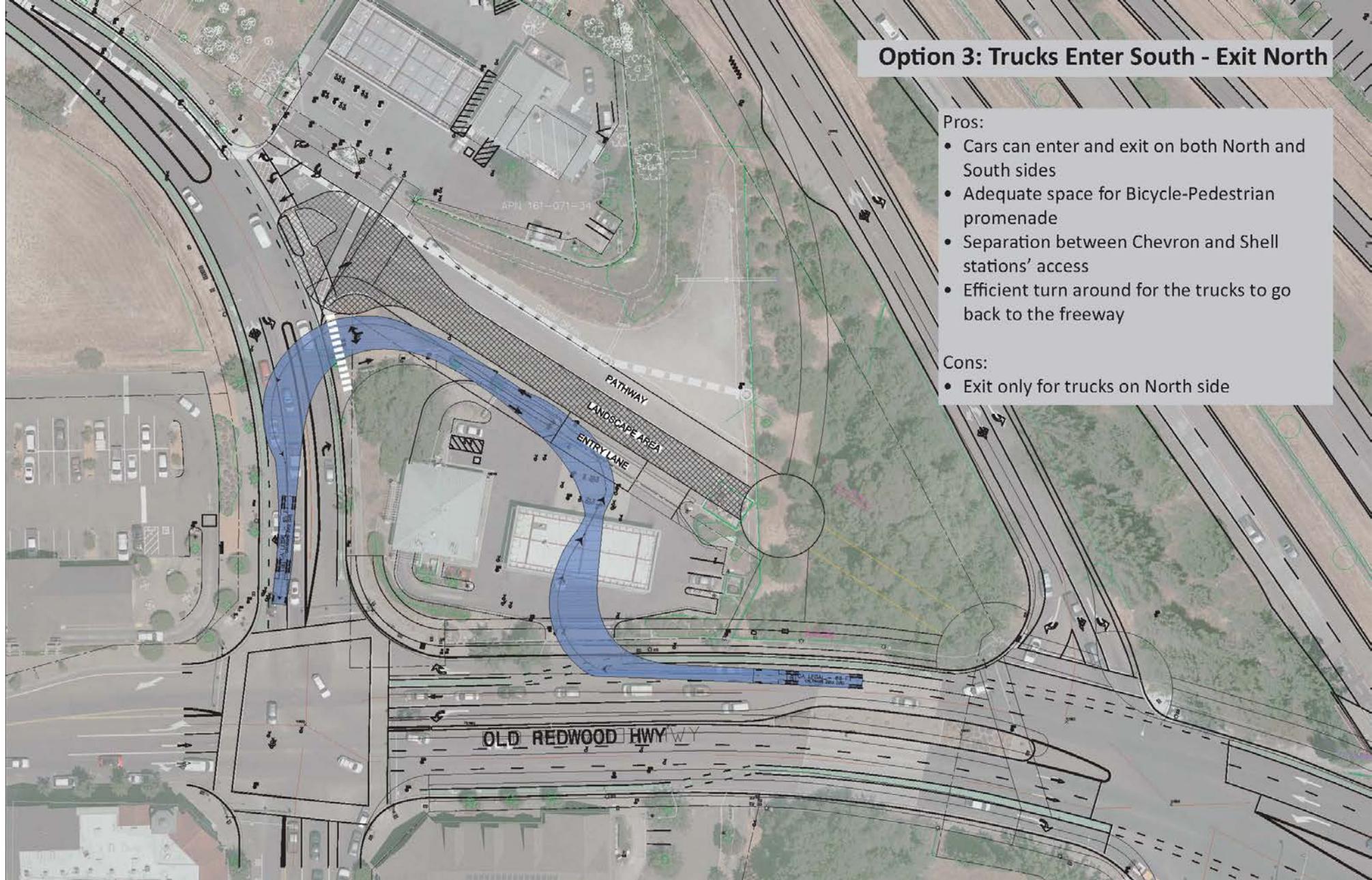
CONNECTING WINDSOR



OLIVER'S

CHEVRON

CONNECTING WINDSOR



Option 3: Trucks Enter South - Exit North

- Pros:
- Cars can enter and exit on both North and South sides
 - Adequate space for Bicycle-Pedestrian promenade
 - Separation between Chevron and Shell stations' access
 - Efficient turn around for the trucks to go back to the freeway
- Cons:
- Exit only for trucks on North side

BEAUTIFICATION OPTIONS



MURALS



GREEN WALLS



LIGHTING & COLOR



RIGHT-TURN SLIP LANE TO US 101

- Divert traffic from dangerous crosswalk
- Overall reduction of delay
- Improved PM level of service on Lakewood southbound
- Improved PM level of service on eastbound left-turn from ORH
- Rectangular Rapid Flashing Beacon for crosswalk at existing on-ramp entrance
- Crossbikes alongside crosswalks

Reduced congestion on Lakewood

Approximately 25% fewer vehicles crossing this crosswalk and crossbike

NEW ON-RAMP ENTRANCE FROM LAKEWOOD



CONNECTING WINDSOR



LAKWOOD DRIVE

OLD REDWOOD HIGHWAY

US 101
NORTH
ON-RAMP

CONNECTING WINDSOR

LAKEWOOD-AMIGOS PATH

New shared-use pathway with landscaping, trees, lighting

CONDE PATHWAYS

Enhanced Windsor Creek experience
Widened pedestrian paths
New landscaping, trees, lighting, surface treatments, public art



LAKEWOOD-AMIGOS PATH



CONDE PATHWAYS

OLD REDWOOD HIGHWAY

CONDE LANE

PRELIMINARY CONSTRUCTION COST ESTIMATES (\$M)

- | | |
|-----------------------------|----------|
| 1. Underpass Improvements | \$2-3.9 |
| 2. Streetscape Improvements | \$2.4 |
| 3. ORH Promenade | \$2.5 |
| 4. Lakewood Slip Ramp | \$2.2 |
| 5. Conde Pathways | \$0.2 |
| 6. Lakewood-Amigos Pathway | \$1.3 |
| 7. New Undercrossing | \$7.5-16 |
| 8. New Overcrossing | \$8-10 |

