



Living Laboratory Phase II Rightsize Update



Transportation Advisory Board
June 15, 2015
Public Hearing



- > Enhance on-street system to be more **safe and comfortable** to all users
- > Test **innovative** engineering treatments and programs
- > Provide **interactive 'real world'** user experience





The TMP sets ambitious yet realistic mode share goals of:



Objectives

Reduce Vehicle Miles Traveled (VMT) by 20%

Reduce Single Occupant Vehicles (SOV) to 20% of all trips

Reduce mobile source emissions

Max of 20% roadways at LOS F

Expand fiscally viable alternatives for residents & employees

Increase alternatives with rate of employee growth

Toward Vision Zero traffic injuries

Increase neighborhood accessibility

Reduce VMT per capita by 20% for residents and employees

Living Lab – Phase I projects

Installed 2013 – 2014

Cycle Track

Baseline road

Buffered Bike Lanes

University Avenue and Spruce Street

Back-in-angle Parking

University Avenue

Electric Assist Bike Pilot

Certain off-street multi-use paths

Dashed (advisory) Bike Lanes

Harvard Lane

Parking protected bike lanes

University Avenue

Evaluation Measures

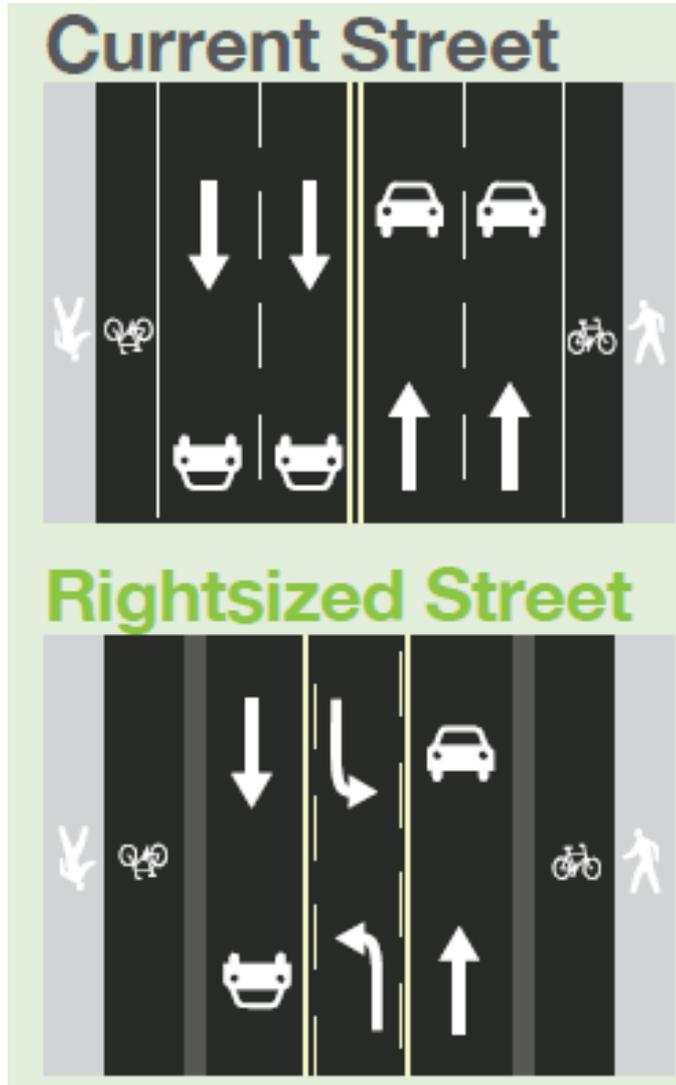
- Field observations
- Speed & volume
- Crash experience
- Community input

Evaluation Results

- Adjust implementation
- Maintenance
- Informing Phase II

Phase II Complete Streets Projects

What is Rightsizing?



Rightsizing goal

- Improve safety access and comfort for all travel modes.

Pilot Project goals

- Determine acceptable vehicle delay and queuing
- Signing, striping and markings
- User experience

- 30% decrease in crashes
- 56% reduction in speeding
- 6.4% reduction in traffic volume



Division Street, Portland OR

- 80% decrease in pedestrian crashes
- 80% reduction in speeding
- 35% increase in bicycling



Stone Way North in Seattle, WA

Case Studies

- Portland OR
- Raleigh NC
- Seattle WA
- Tampa FL
- Charlotte NC

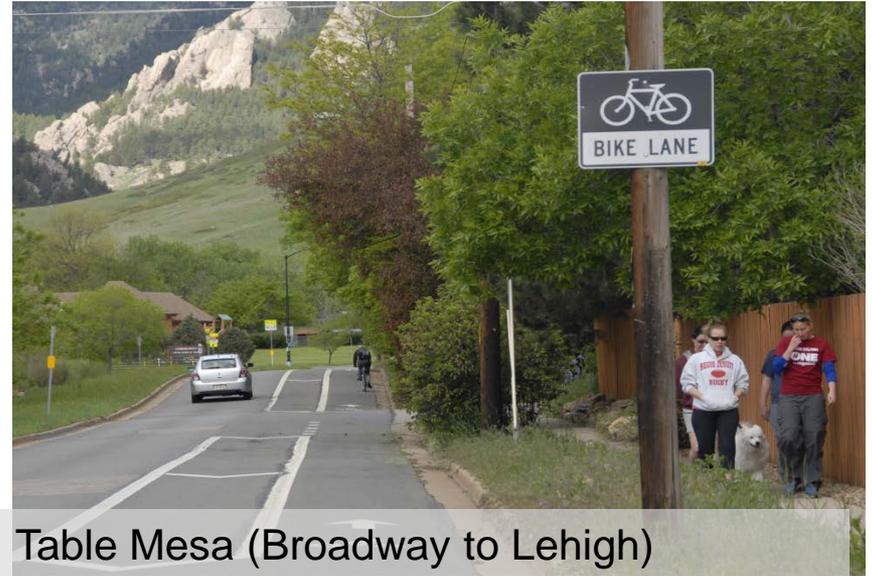
Rightsizing results

- Decreased crashes
- Reduced vehicle speeds
- Increased bike trips

FHWA research:

29% reduction in total crashes

Rightsizing in Boulder



Living Lab Phase II process

Planning & Design

Fall 14 – Winter 15

- Select candidate corridors
- Develop communications plan
- Conduct multi-modal analysis
- Develop design options

Spring 2015 Public Input

May – Jun. 2015

- Execute communications plan
- Engage community members
- Identify stakeholder concerns



Refine & Install

Summer 2015

- Address stakeholder concerns
- Finalize design
- Install pilot projects

Pilot Evaluation

Sept. 15 – Winter 16

- Technical transportation data
- Observational studies
- User Experience

Post-pilot approach

Spring 16

- Inform 2.0 bikeway design guidelines
- Refine multi-modal access design

Living Lab Evaluation

(Before, During and After)



Technical data

Speed
Volume
Travel time
Intersection delay

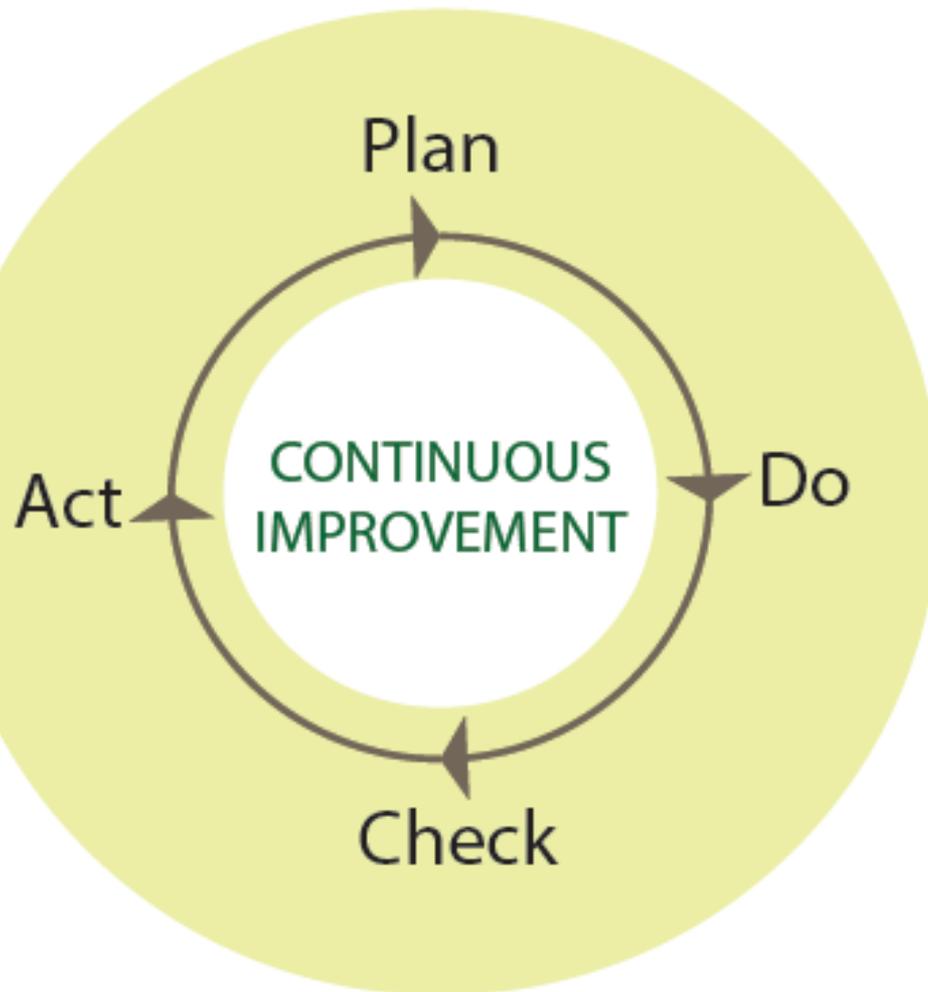
Observation Surveys

Demographics
Behavior
Conflicts

Community Input

Inquire Boulder
Bike/Walk Audits
Pop-up events
Surveys
Stakeholder meetings

Living Lab continuous improvement



Phase I

- Bike focused
- Opportunistic

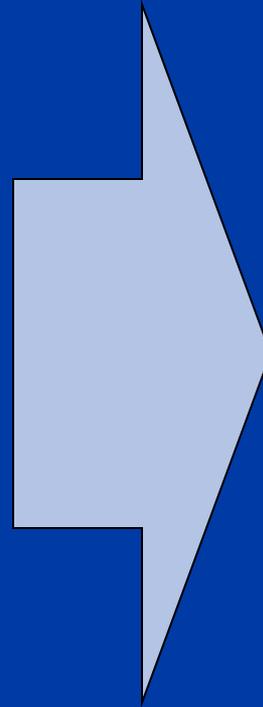
Phase II

- Informed by Phase I
- Explore options and tradeoffs

Selection Criteria

Rightsizing multi-lane arterial roadways

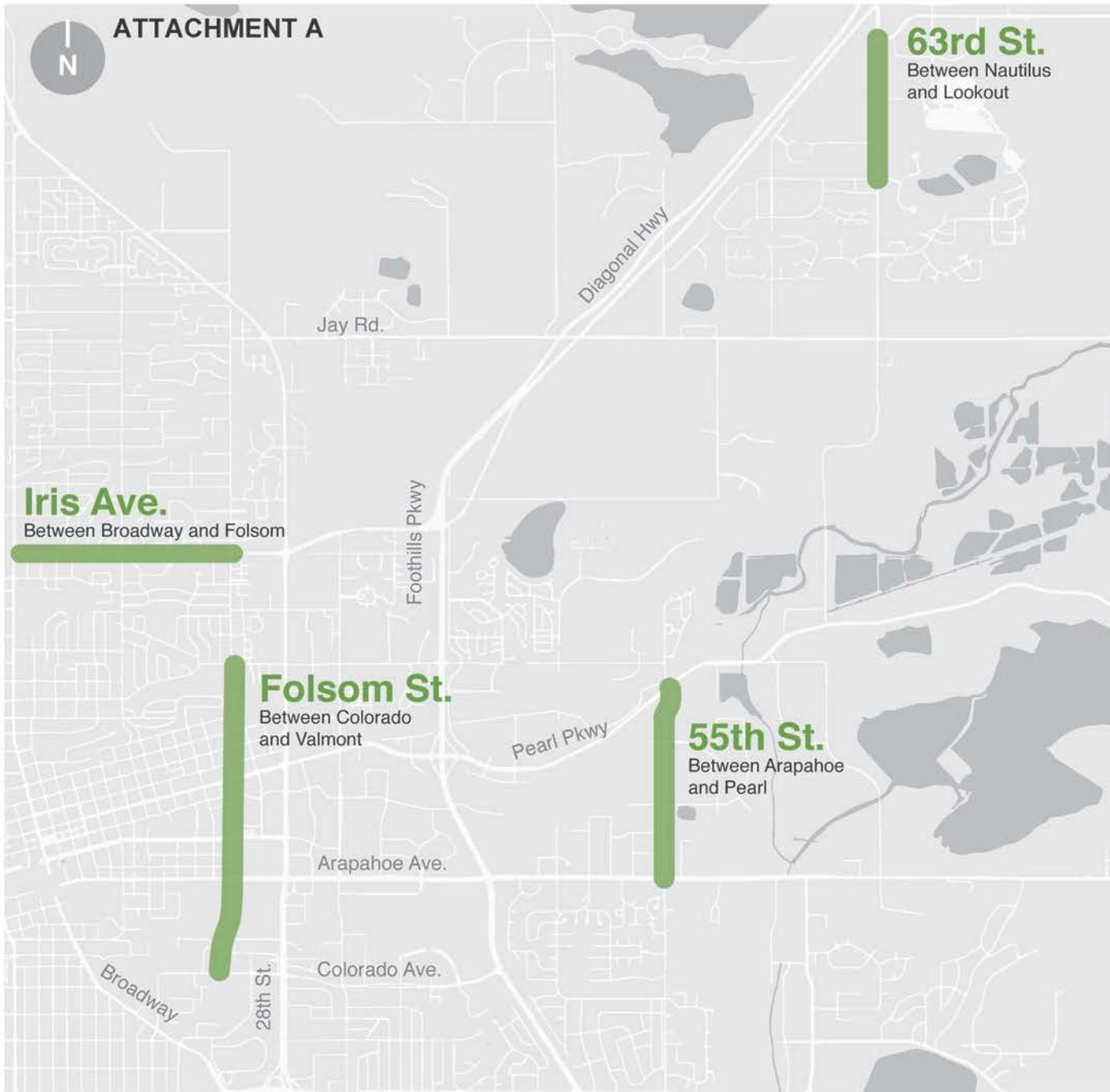
- Local street vs. state highway
- Cross section/number of lanes
- Vehicle Speed
- Collision history
- Multimodal LOS
- Multimodal Traffic volumes
- Resurfacing schedule
- Displaced traffic



- Iris Avenue
- Folsom Street
- 55th Street
- 63rd Street



ATTACHMENT A



Iris Ave.

Between Broadway and Folsom

Folsom St.

Between Colorado and Valmont

55th St.

Between Arapahoe and Pearl

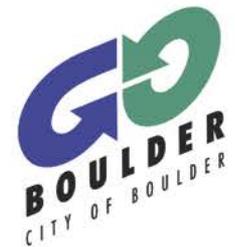
63rd St.

Between Nautilus and Lookout

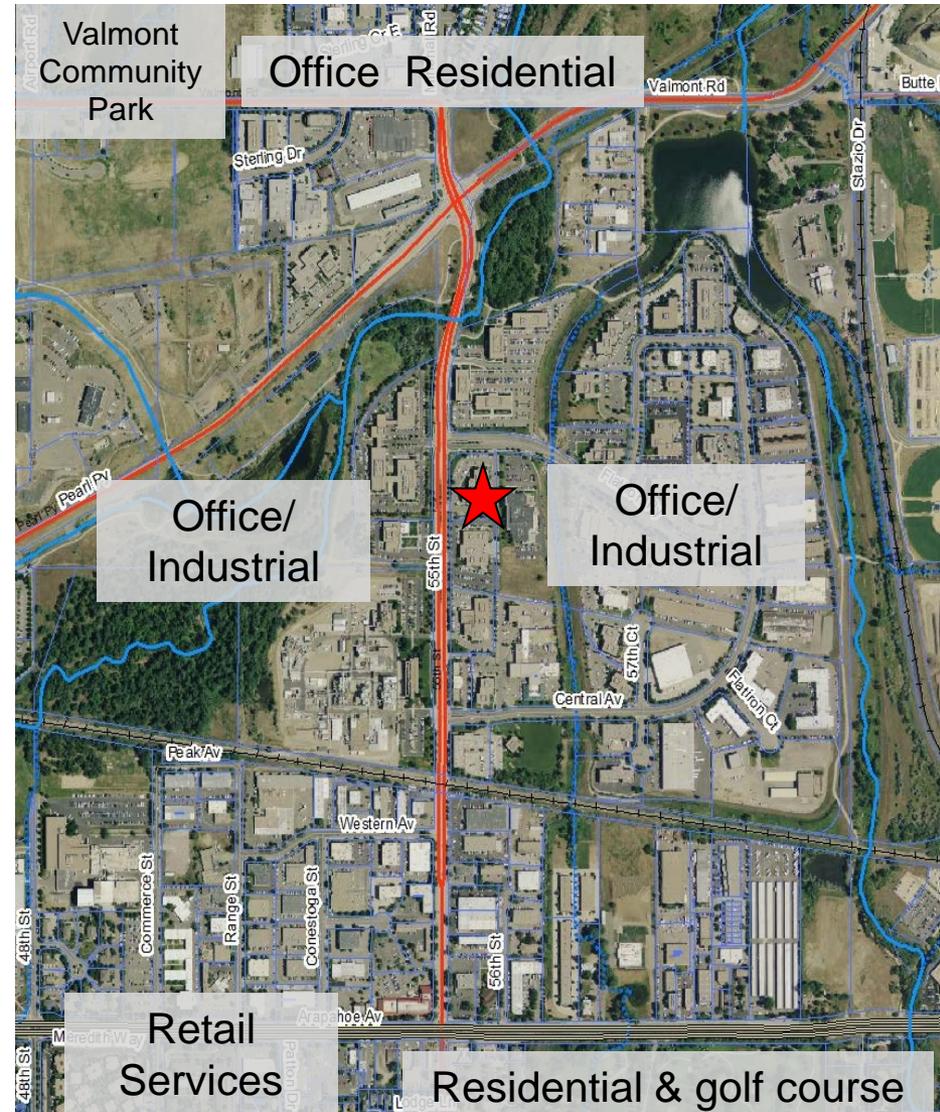


Rightsizing Candidate Corridors Map

For more information visit: BoulderLivingLab.net



55th Street



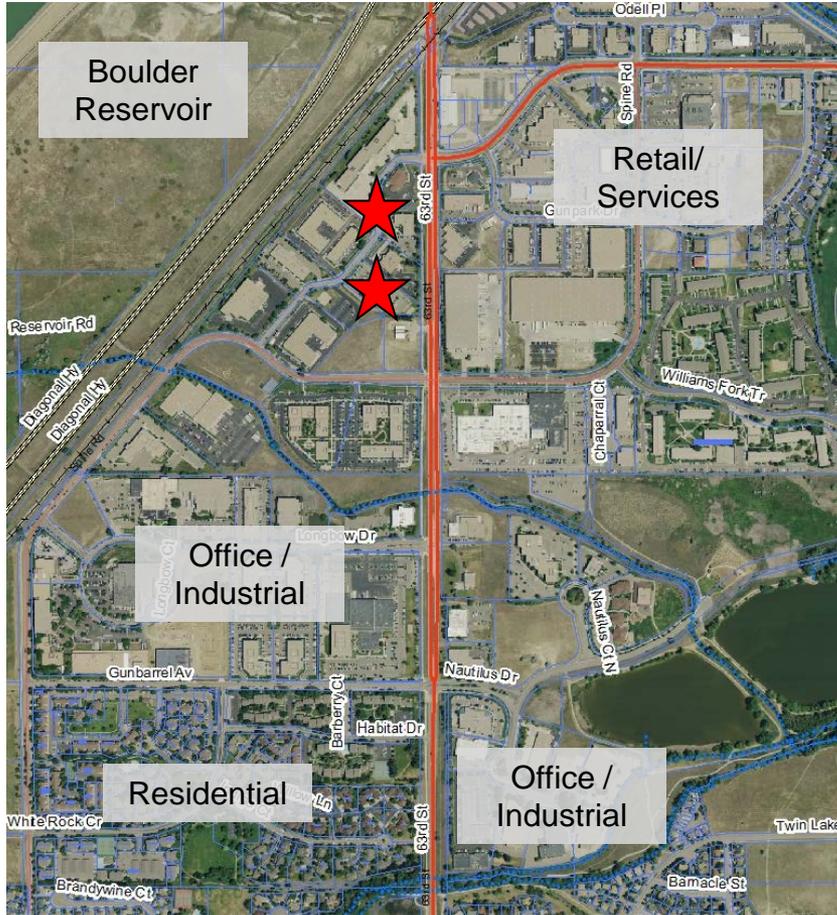
Existing



Proposed



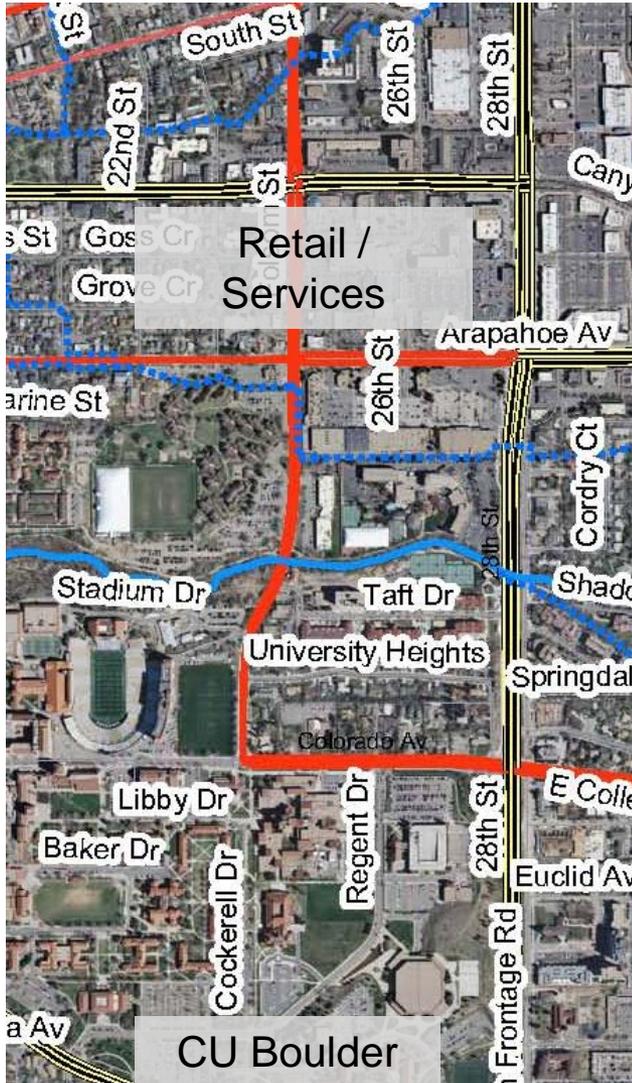
63rd Street



★ = emergency services



S. Folsom Street



Iris Avenue



Spring 2015 Engagement

- Enhanced and focused public process
- Social media, traditional and innovative approaches
- 190+ attended stakeholder meetings
- 500+ written comments/correspondence



Spring 2015 Engagement

Monday	Tuesday	Wednesday	Thursday
4	5	6	7
East Stakeholder Meeting Valmont Presbyterian Church	Pop Up Events Iris Avenue City Council Meeting	West Stakeholder Meeting Unity Spiritual Center of Boulder	Walk/Bike Audit Iris + Folsom Pop Up Events McGuckins 11:00am-2:00pm
11	12	13	14
TAB Meeting	Pop Up Events 55th Street Upslope	Presentation to Better Boulder	
18	19	20	21
Pop Up Events 63rd Street Avery Tap Room		Living Lab Open House BMOCA	Walk/Bike Audit 55th
25	26	27	28
Memorial Day			Presentation to Boulder Chamber
1	2	3	4
Walk/Bike Audit 63rd 4 to 6 p.m.	Neighborhood Meetings Iris Avenue		
8	9	10	11
TAB Meeting Council Chambers 6 p.m.			Stakeholder Meetings 55th Street
15	16	17	18
Council Meeting Council Chambers 6 p.m.			

May / June 2015

Community Input

Considerations on the rightsizing approach

- > Strike a balance among travel modes.
- > Design aesthetics are important.
- > Winter maintenance is a concern.
- > Motor vehicle traffic flow and congestion are a concern, especially in the event of emergency response situations.

Community Input

Concerns for testing rightsizing treatments

- > Increases cyclist and bus interactions.
- > Delays of vehicles turning left onto rightsizing corridor from side streets without traffic signals.
- > Diverting traffic onto nearby residential streets
- > Delays along 55th Street due to the train crossing, tractor trailer trucks and buses.
- > Increased traffic along 63rd Street due to the residential and commercial developments recently completed and underway.

Community Input

Support for testing rightsizing treatments

- > Improves safety, especially crossing the roadway.
- > Encourages walking and bicycling.
- > More buffer is better.
- > Increases walking and biking comfort.
- > Improves and provides more north-south bicycling route options.
- > Slows motor vehicle speeds.

Highlights of Multimodal Analysis



- Rightsizing all four candidate corridors is feasible
- Achieves multimodal enhancements for bicycling and walking



- Goals of rightsizing can be achieved for 55th & 63rd Streets with minimal travel delay



- Vehicle travel delay forecasted for Iris Avenue and Folsom Street

- Design Options prepared to address operational challenges



VISSIM Modeling

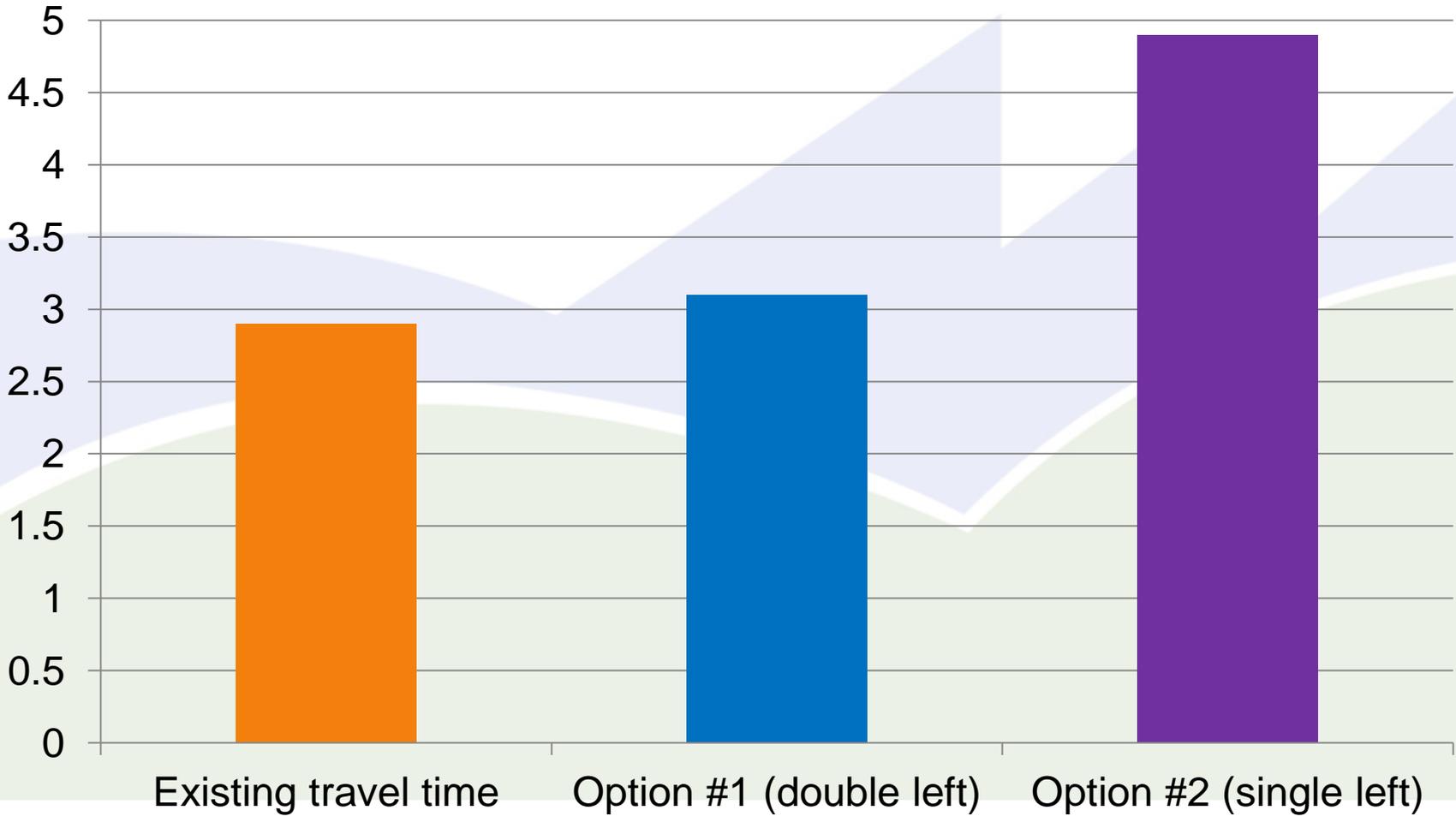
- Utilized traffic modeling
 - Synchro (macroscopic) & VISSIM (microscopic)
 - Compared travel times: existing vs. proposed
 - Forecasted corridor impacts associated with rightsizing
 - Identified challenging segments/intersections along Iris and Folsom corridors



Summary of Rightsizing Options

- Two options for Iris Avenue
 - # of left turns at intersection of Broadway
- Three options for Folsom Street
 - Rightsize to South, Canyon, or Arapahoe?
- One option for 55th Street
- One option for 63rd Street

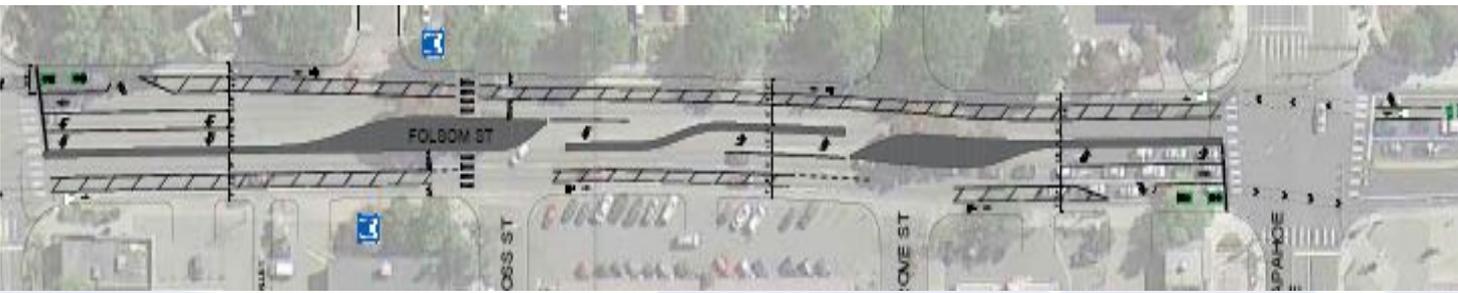
Iris Travel Times (Minutes)



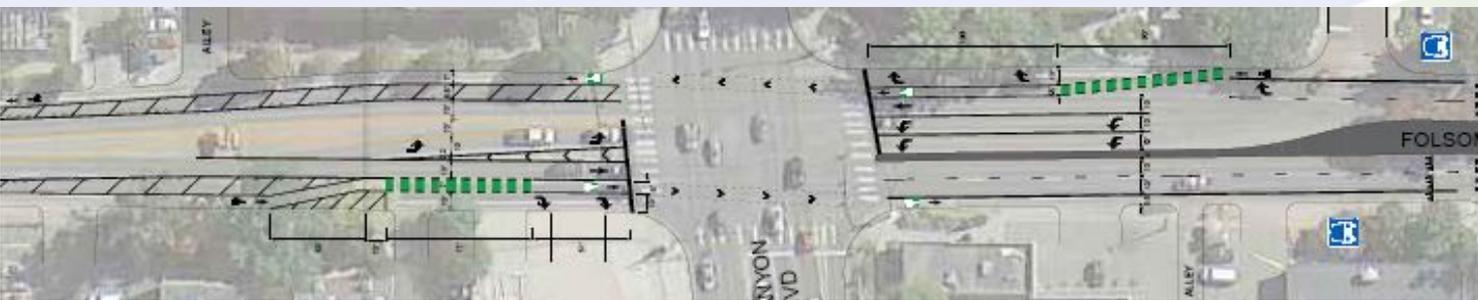
PM Peak Period

Folsom Street - 3 Design Options

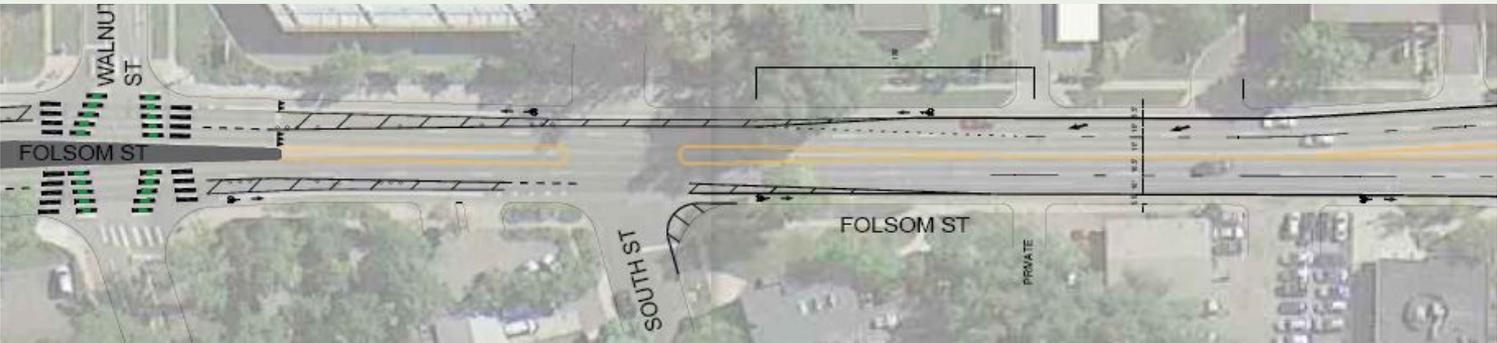
Rightsize to Arapahoe Ave.



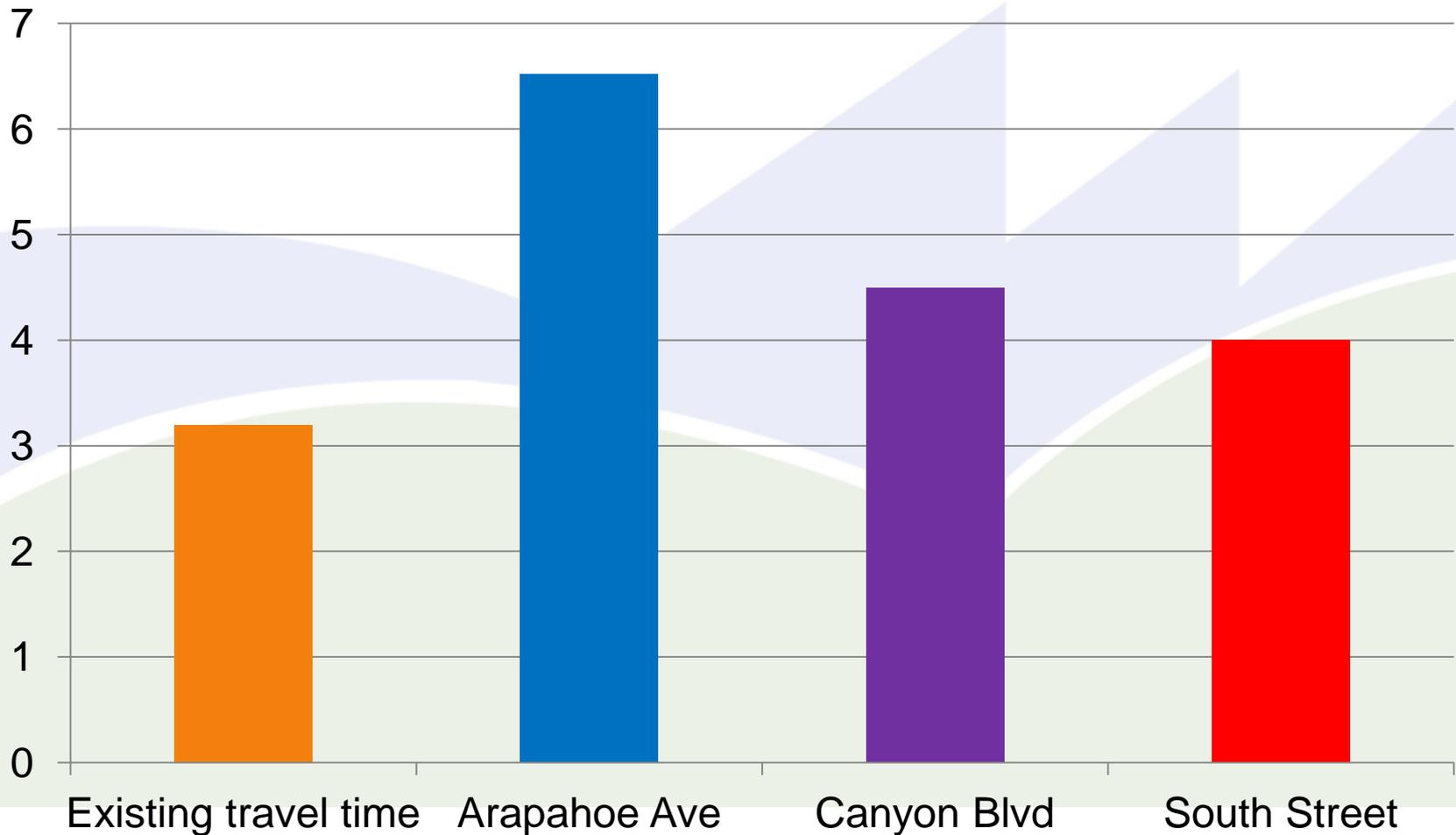
Truncate rightsize to Canyon Blvd.



Truncate rightsize to South St.

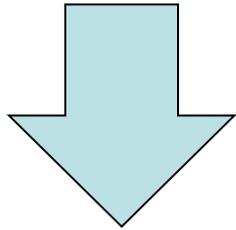


Folsom Travel Times (Minutes)

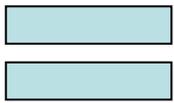


PM Peak Period

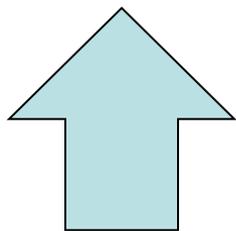
Anticipated Rightsizing Results



- > Decrease in motor vehicle speeds
- > Decrease in overall traffic collisions and severity of injuries



- > Minimal delay for vehicle travel times
- > Minimal impact to emergency response times



- > Increase in bicycle volume and types of riders
- > Improved pedestrian experience
- > Dedicated space for left turns
- > Neighborhood livability

Evaluation Criteria

(before – during – after)

- Public feedback
- Crash history and conflicts
- **Bicycle volume, demographics**
- Right turn treatments, turning movement counts
- Neighborhood traffic diversion
- **Motor vehicle volume, speed, & travel time**
- Pedestrian crossing volume
- Transit – on time performance
- Winter maintenance practices
- **Emergency response times**

Staff Recommendation

Iris Avenue Option #1

- > Right-size from Folsom Ave. to east of Broadway and install protected bike lanes
- > Maintain dual WB left-turn lanes at Broadway.
- > Construct multi-use path on the north side of Iris

Folsom Street Option #2

- > Rightsize from Valmont Rd. to Canyon Blvd. and install protected bike lanes
- > 1' buffer between Canyon & Arapahoe
- > Bike box at Arapahoe
- > Continue treatment south of Arapahoe to Colorado

63rd Street

- > Rightsize full extent of the proposed project along 63rd Street from Lookout Road to Gunbarrel Avenue/Nautilus Drive

55th Street

- > Rightsize full extent of the proposed project along 55th Street from Pearl Parkway to Arapahoe Avenue.

TAB recommendation to Council

- Recommended staff proposal

Additional Feedback

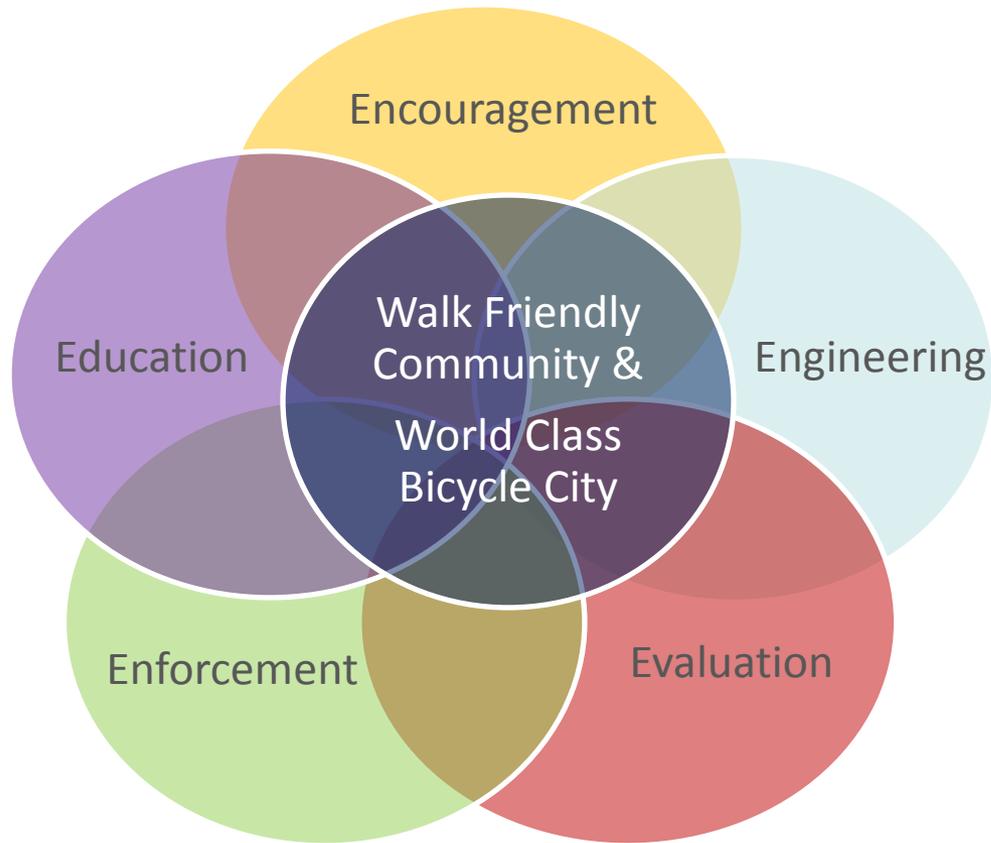
- Living Lab offers opportunity to nudge incremental change in mode share trends
- Before/after monitoring to assess potential traffic diversion along Iris Ave.
- Frequent updates with opportunity for refinements
- More clarity on baseline data

Next steps

Based on Council consideration tonight

- > Installation July – Aug.
- > Initial observations Aug – Sept.
- > Monthly check in with TAB
 - Phase I results and next steps
 - Phase II updates and discussion on potential refinements
- > Technical data collection fall '15 & summer'16
- > Evaluation results fall '16
- > Incorporate findings for bicycle design guidelines, future corridor projects and public engagement strategies

Five E's





Thank You!



www.BoulderLivingLab.net
Living Lab

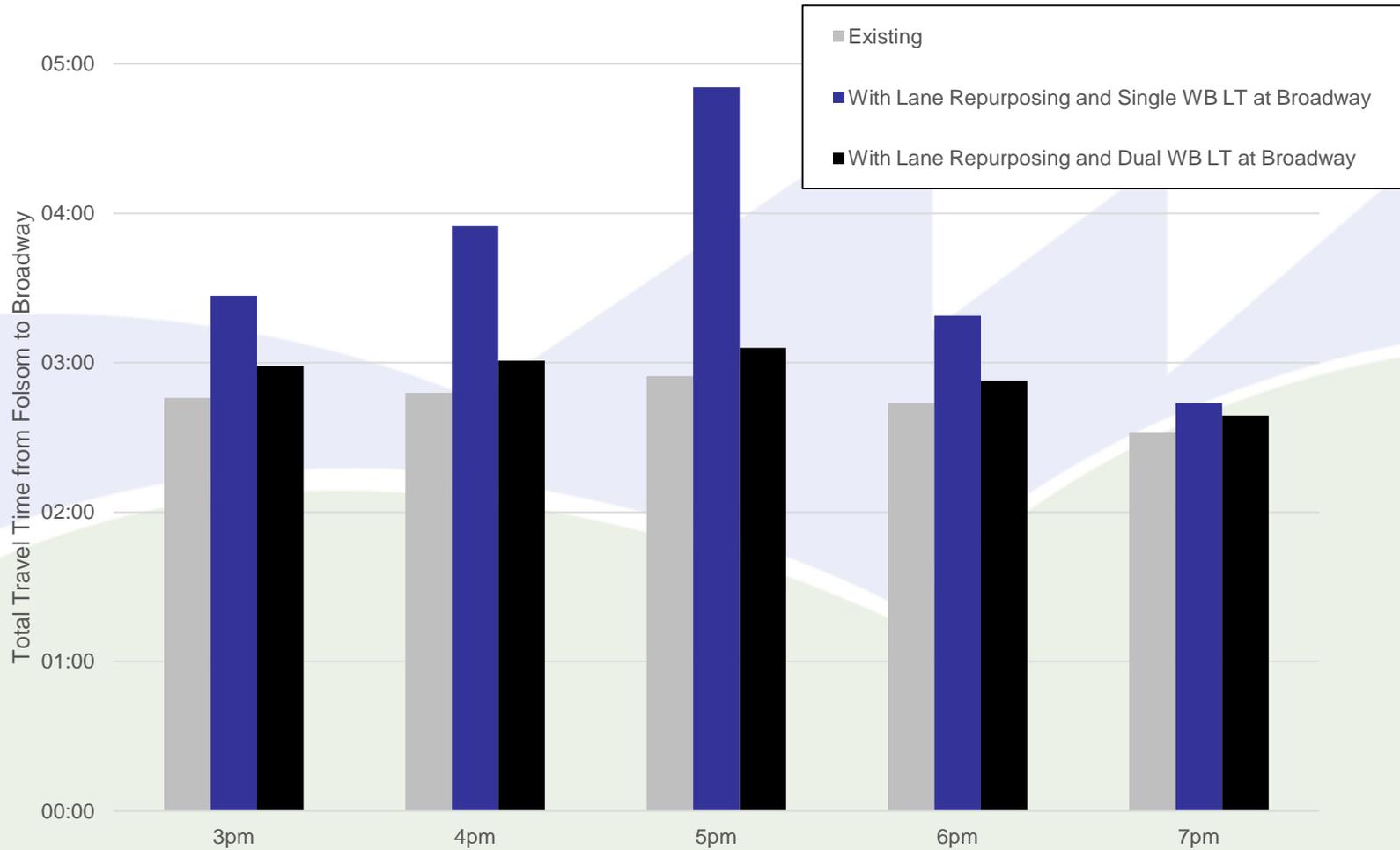
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55th Street Travel Times (Minutes)

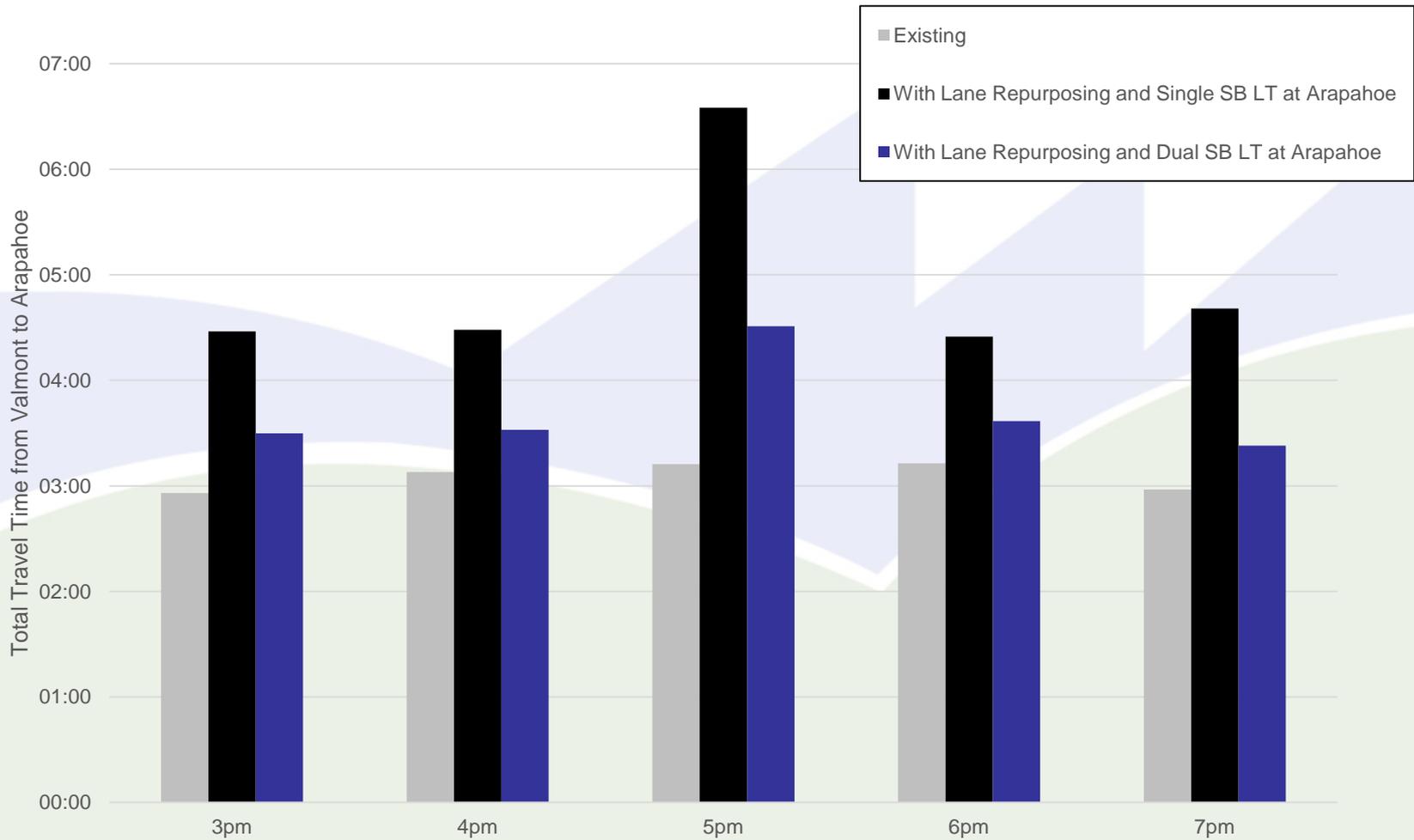
Direction	Peak Hour	Existing	With Rightsize Treatment
Northbound	AM	2:15	2:30 (+0:15)
	PM	2:49	2:49 (no change)
Southbound	AM	2:10	2:17 (+0:07)
	PM	2:16	2:26 (+0:10)

Iris Avenue Westbound VISSIM Total Travel Time Estimate by Hour



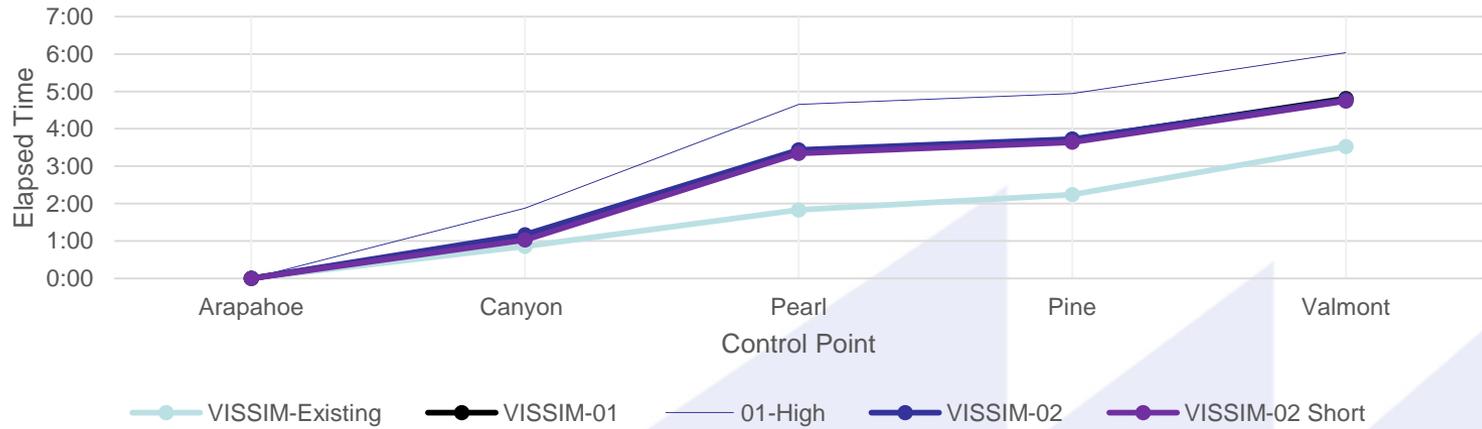
32% of total traffic over a 24 hour period is between 3:00pm – 7:00pm

Folsom Street Southbound VISSIM Total Travel Time Estimate by Hour

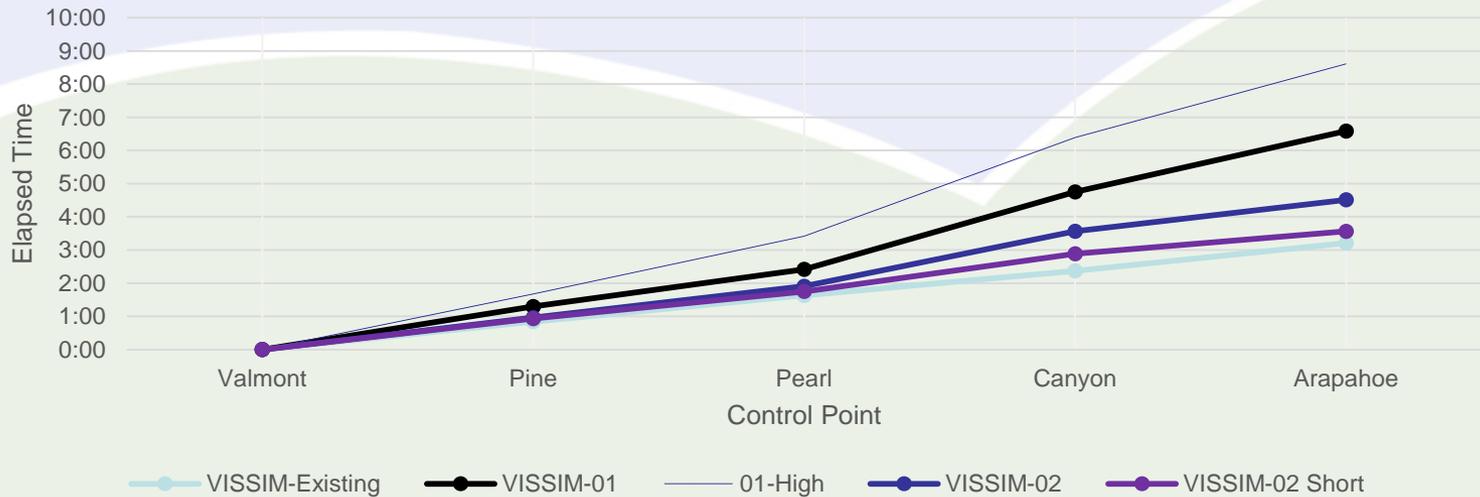


38% of total traffic over a 24 hour period is between 3:00pm – 7:00pm

Travel Time Comparison - w/Lane Repurposing Folsom-Northbound PM

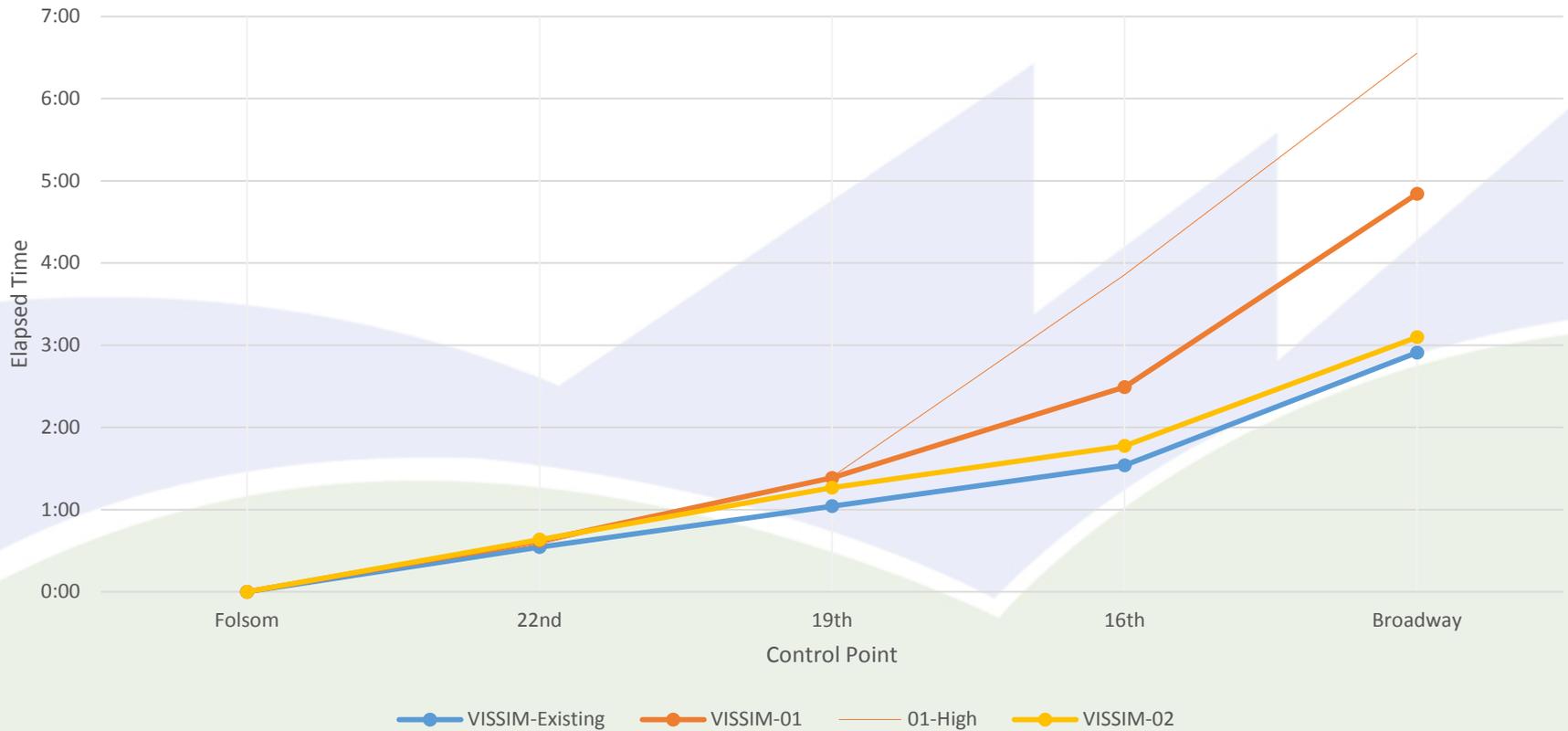


Travel Time Comparison - w/Lane Repurposing Folsom-Southbound PM



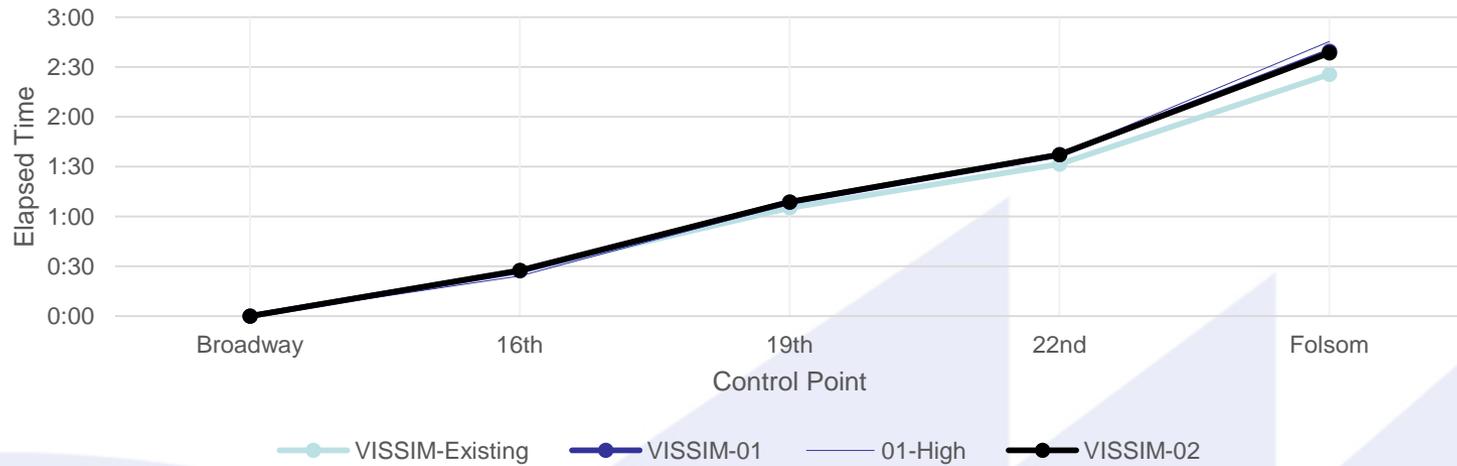
VISSIM-01=single left turn lane at Arapahoe --VISSIM-02=double left turn lanes at Arapahoe
 VISSIM-02 (short)=End rightsize at Canyon Rd.

Travel Time Comparison - w/Lane Repurposing Iris-Westbound PM

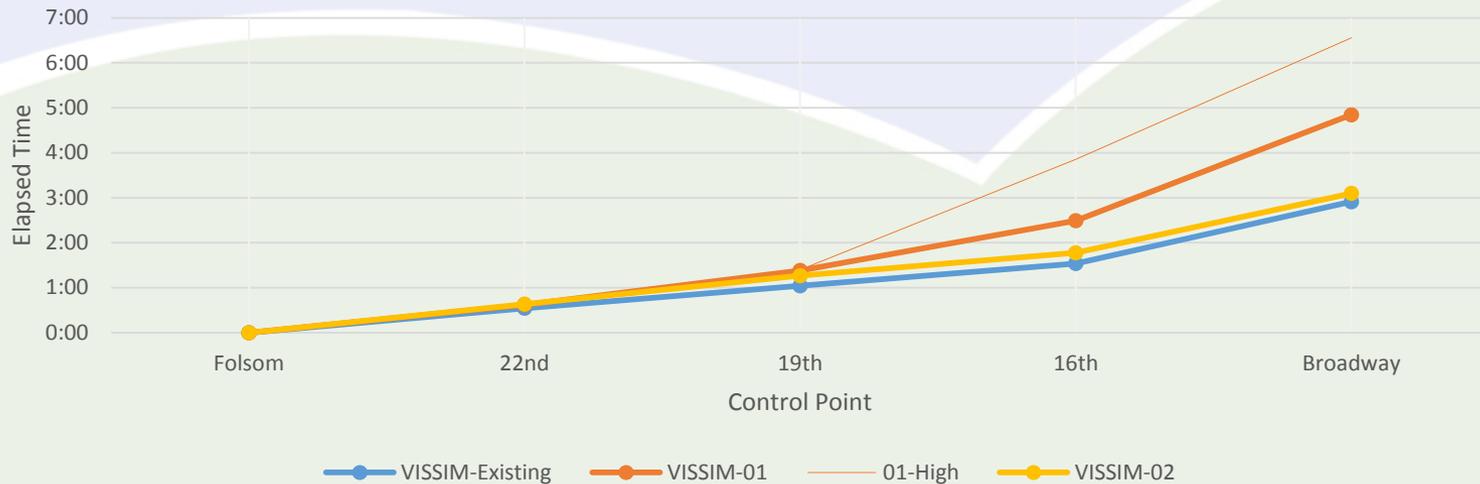


VISSIM-01=Single left turn lane at Broadway
VISSIM-02=Double left turn lane at Broadway

Travel Time Comparison - w/Lane Repurposing Iris-Eastbound PM

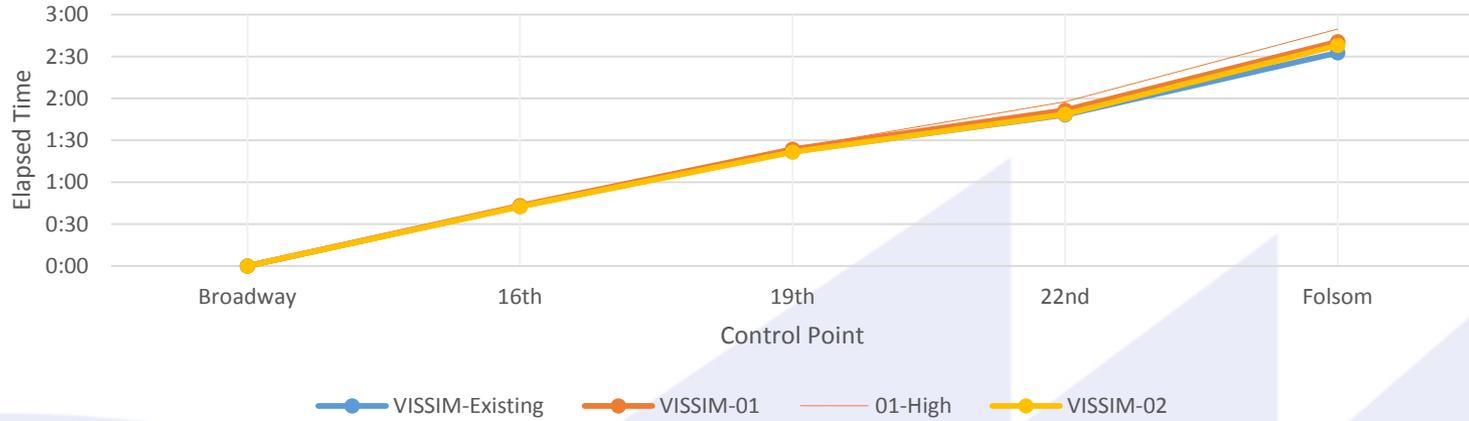


Travel Time Comparison - w/Lane Repurposing Iris-Westbound PM

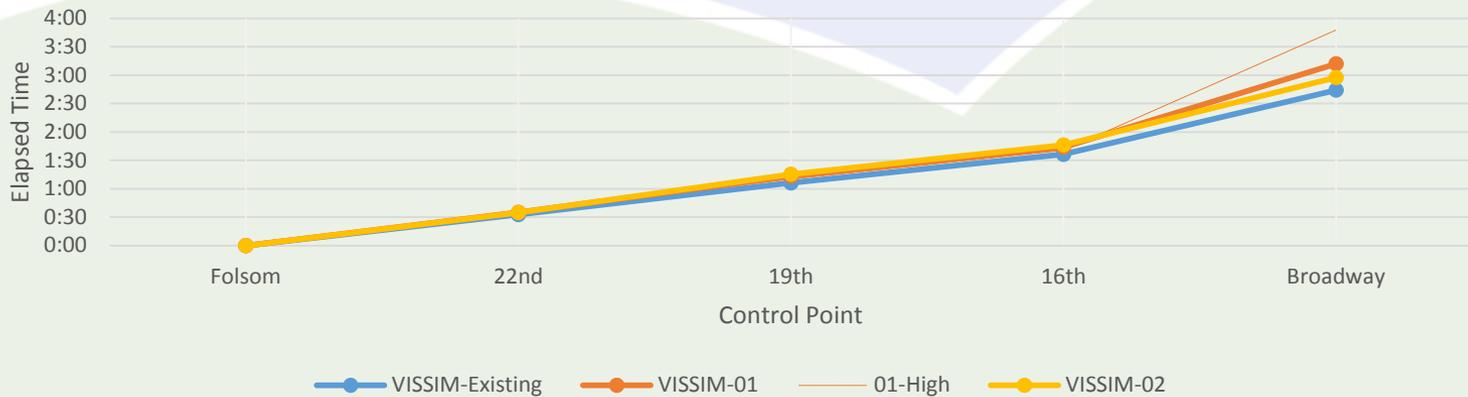


VISSIM-01=Single left turn lane at Broadway
VISSIM-02=Double left turn lane at Broadway

Travel Time Comparison - w/Lane Repurposing
Iris-Eastbound AM



Travel Time Comparison - w/Lane Repurposing
Iris-Westbound AM



VISSIM-01=Single left turn lane at Broadway
VISSIM-02=Double left turn lane at Broadway

2012 Travel Diary

key findings:

- Men bike at a rate 2x that of women
- Women make more Single Occupant Vehicle Trips than men
- More bike trips for recreation than transportation



Living Lab – Phase I projects

Wave 1
Installed Fall 2013



Back in angle parking



Barrier separated cycle track



Buffered bike lanes



E Bikes on multi-use paths

Living Lab – Phase I projects

University Avenue-
parking protected
bike lanes



Wave 2
Installed October 2014



Harvard Lane
Dashed (advisory) bike lanes