

HDR

Economics of Active Transportation - Overview of Caltrans

Compass Speaker Series

Boise, ID

9/30/26



1

Transportation Economics

2

Active Transportation BCA

3

Overview of Caltrans Cal-B/C AT Model

4

Adapting Caltrans Cal-B/C Model

Transportation Issues

- Transportation is undesirable:

- Time Consuming
- Costly
- Risky
- Uncomfortable

- Users seek:

- Faster
- Cheaper
- Safer
- More comfortable
- More options



Transportation Solutions

- High cost
- Disruptive
- Location-specific
- Sub-population of beneficiaries
- Mode-targeted and vehicle-biased
- Multi-modal, *sometimes*
- Leaves lasting impact on community



Complete Streets:

A Broader Concept of Public Right of Way

- Prioritize safety, comfort, connectivity
- Serve multiple modes and users
- New aesthetic designs
- Gathering places
- Alternative mode, additional benefits
 - Avoids undesirable transportation
 - Provides enhanced journey quality
 - Improves health and well being
 - Reduces congestion for others



Source: APA, [The Continuing Evolution of Complete Streets](#), CityofStPete/Flickr, ColorJam, Chicago

Complete Streets: Multiple Sources of Value

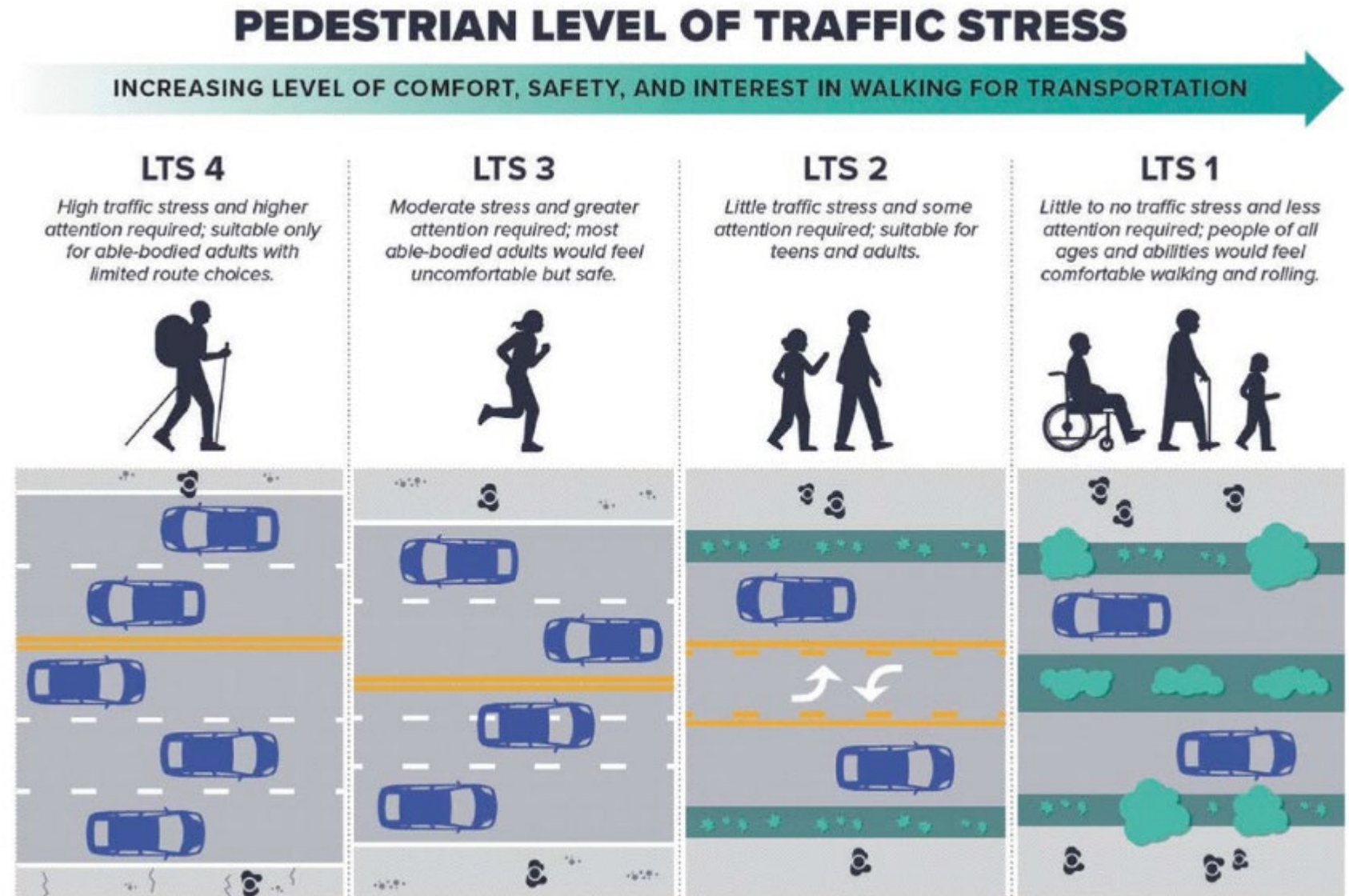
- **Access.** Increase access to common destinations.
- **Modes.** Adapted to alternative and emerging modes
- **Distribution.** Flexibility to address underinvestment and local disruption.
- **Economic Dev..** Street closure can extend capacity to provide service
- **Safety.** Investing in Vision Zero programs to reduce injuries and fatalities
- **Climate change.** Reduce auto trips and emissions.
- **Engagement.** Two-way community and government planning to choose locally desired design and monitoring success



Open Streets corridors provided a vital boost for restaurants and bars, averaging sales 19% above their pre-pandemic baseline while nearby control corridors were 29% below.

Active Transportation: Project Types

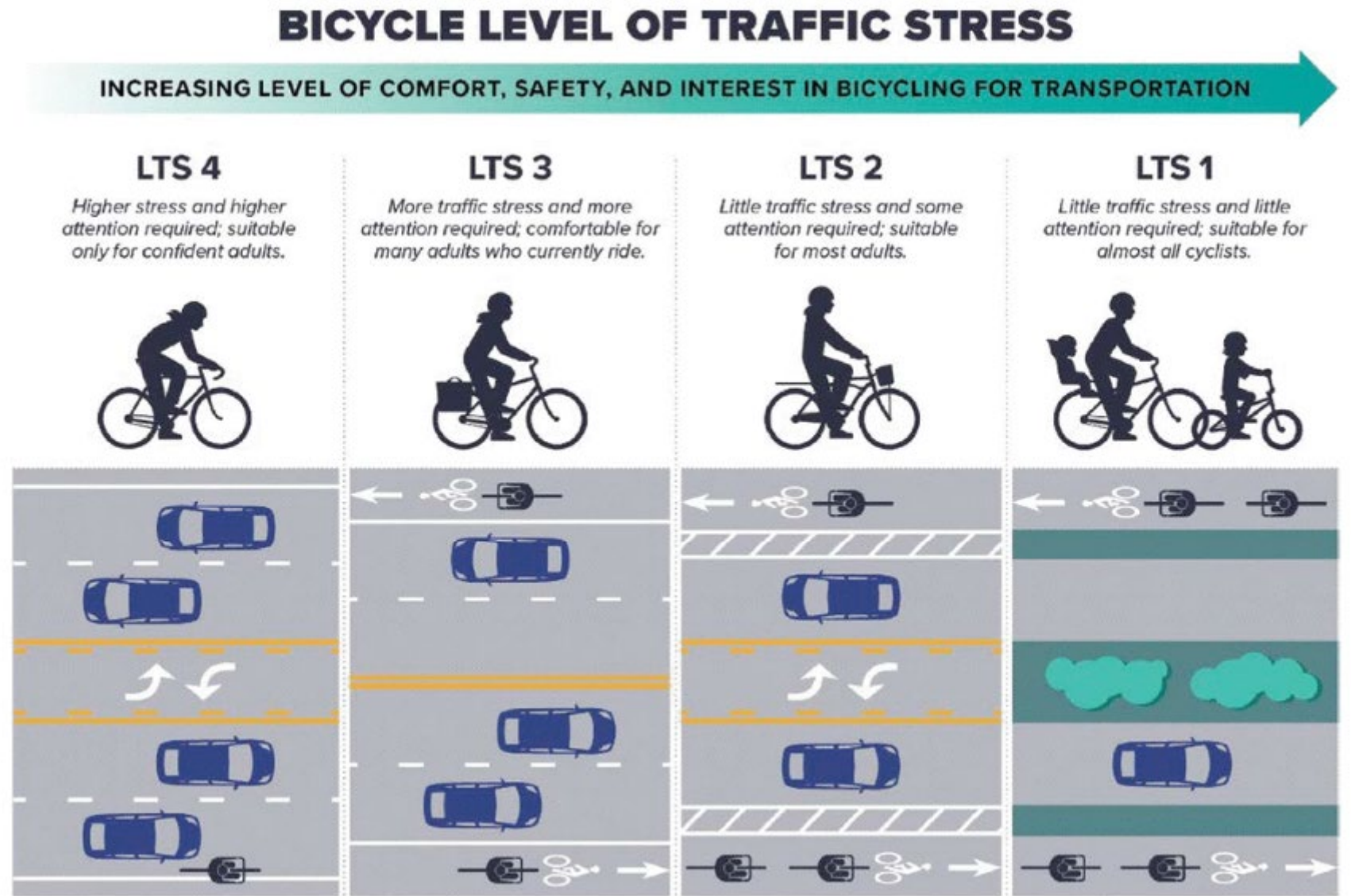
- Demand drivers
 - Width and separation
 - Facility amenities
 - Tree covering
 - Connectivity (to transit, etc.)



Source: Adapted from Oregon DOT (2023).

Active Transportation: Project Types

- Demand drivers
 - Separation from cars
 - Width
 - Safety measures
 - Terrain
 - Connectivity

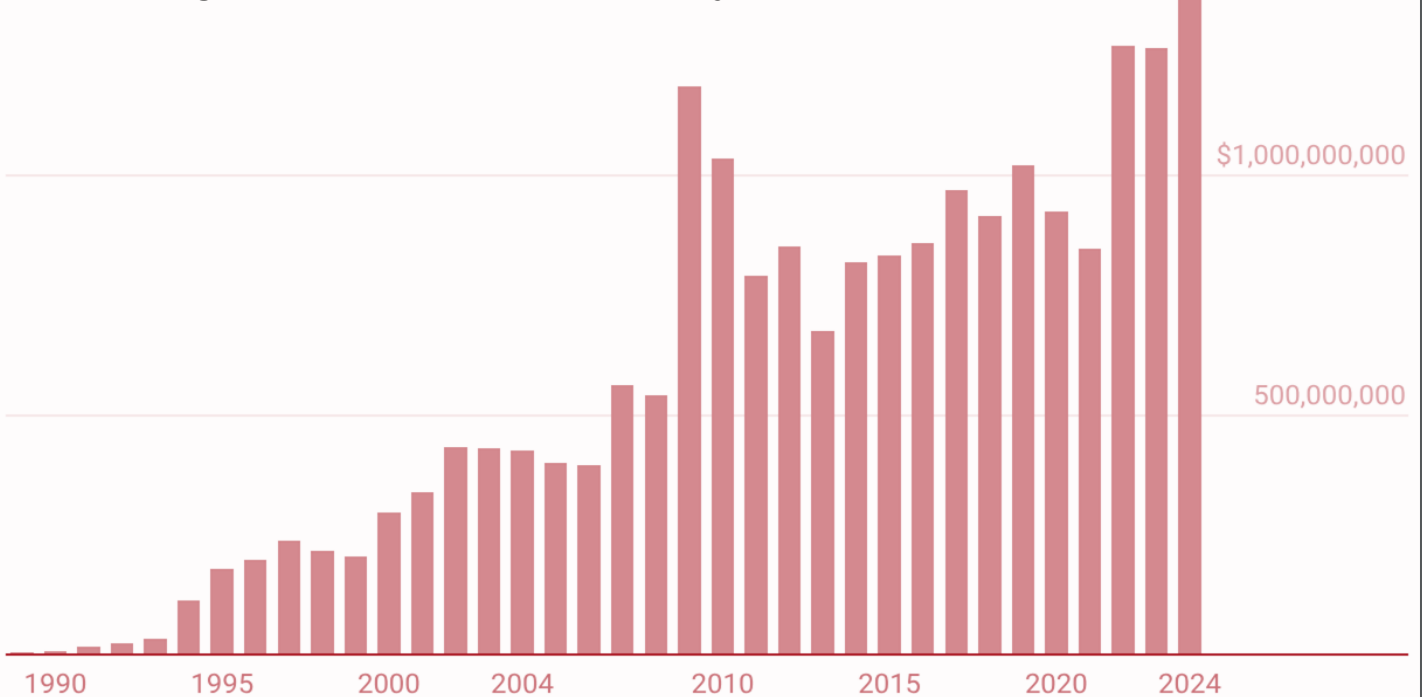


Source: Adapted from Mekuria et al. (2012).

Investments in Active Transportation: Growing over Time

- Significant and sustained growth in investment through 2024
- Reaching well over \$1B by 2022
- Limited growth since 2024
- Key questions:
 - Should we be doing more?
 - What should we do?
 - How do we make the case?

Total Obligations to Bike and Ped Projects



This chart shows obligations from all federal funding programs where the obligation was coded for the improvement type of "Facilities for Pedestrians and Bicycles," "Safety and Education for Peds/Bicyclists," or "Preservation of Abandoned Railway Corridors" in FHWA's Fiscal Management Information System.

Chart: The League of American Bicyclists • Source: FHWA • Created with Datawrapper

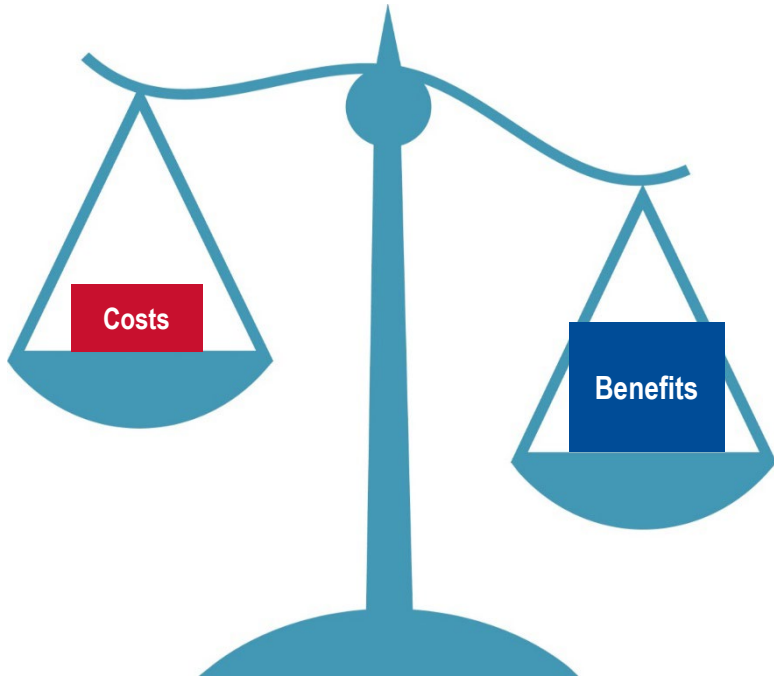
Source: Federal Funding & Planning for Biking & Walking - Benchmarking Report. League of American Bicyclists

Economic Analyses Support Project Decisions

Tale of Two Approaches to Estimating Impact

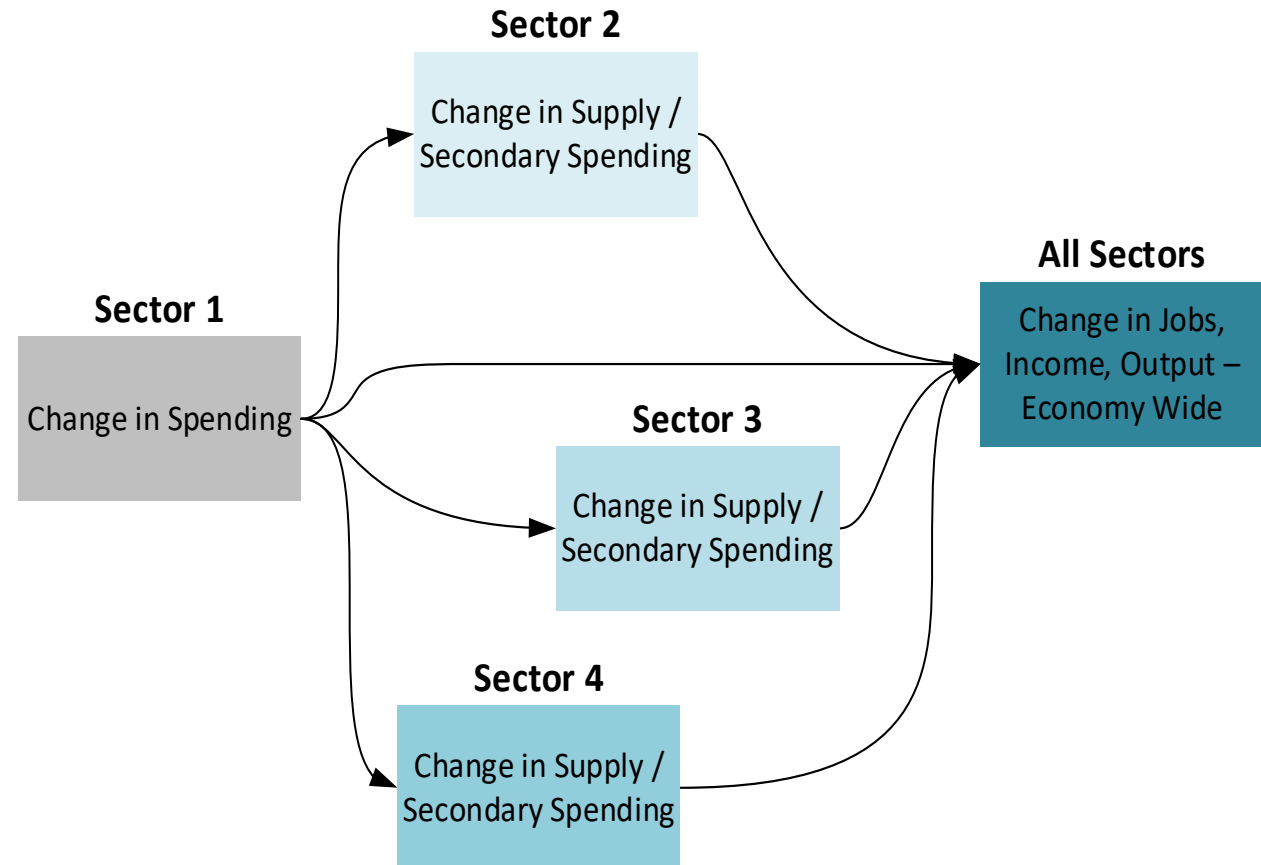
Benefit – Cost Analysis:

Evaluation of Net Benefits (Value for Money)



Economic Impact Analysis:

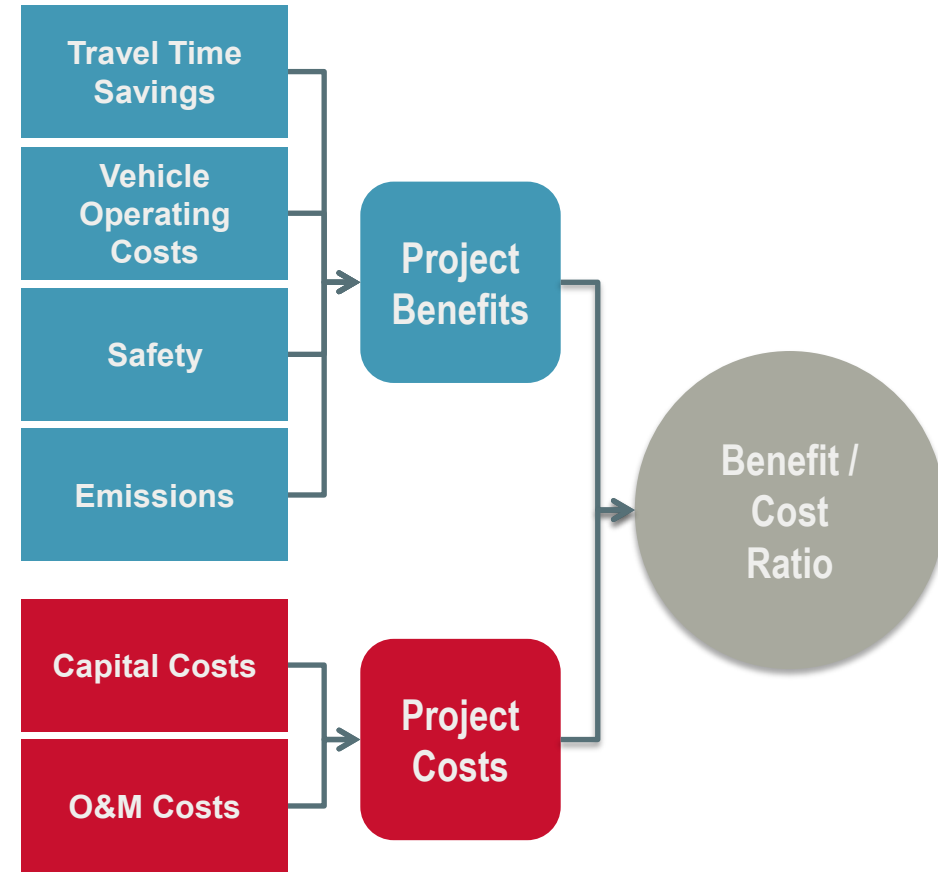
Evaluation of Jobs, Income, Output



Benefit-Cost Analysis

Benefit-Cost Analysis Features

- Systematic approach to compare benefits & costs of alternatives
- Calculations based on separate Build and No Build scenarios
- Measure across modes
- Monetizes multiple metrics
- Determine soundness of alternative investment decisions
- Provide basis for comparing alternatives/projects
- Time value of benefits and costs
- Support agency **decision making**
 - National interest – at least broader than the local
 - Improve economic outcomes
 - Reduce direct household transportation costs



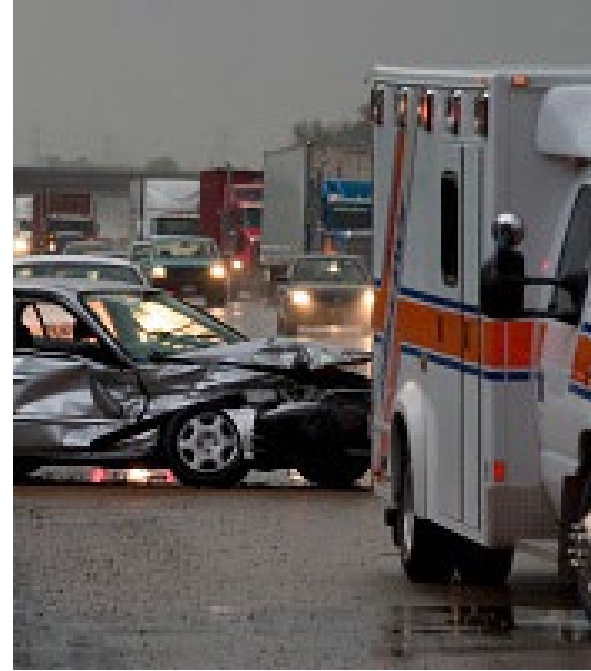
Big Four Benefits



Travel Time Savings



Vehicle Operating Cost



Crash Costs



Emissions

Economic Benefits – Motorized Modes (Pass. Vehicles, Transit)

Total Benefits = # of trips * (Vehicle Use Benefits - Time Savings, Cost Savings, Crash Risk Reduction, Emissions, and potentially others)

Vehicle User Benefits	Impact Factors	Monetization Factors	Notes
Travel Time Savings	Change in time per trip	\$ per hour	\$ value set to national median income
Vehicle Operating Cost Savings	Change in miles per trip	\$ per mile	\$ in average out of pocket costs for average vehicle
Crash Risk Savings	Change in accident rate by type per trip	\$ in accident cost per event	\$ combines out of pocket medical cost and avoidance value
Emissions Cost Savings	Change in miles and speed per trip Emissions rates per type	\$ per emission type	Based on health effects
Journey Quality (Transit)	Change in time or miles per trip	\$ per feature	Features include: additional transit seating, signage, etc.

Other Benefit Categories: pavement damage, maintenance cost savings, reliability, others

Added Benefits for Active Transportation



Journey Quality



Amenities



Health



Property Value

Economic Benefits – Active Transportation Modes (Biking, Walking)

Total Benefits = # of trips * (Journey Quality + Amenities + Health (personal and professional) + Property Value + Vehicle Use Benefits)

Active Mode Benefits	Impact Factors	Monetization Factors	Notes
Journey Quality (Active)	Distance traveled to new facility	\$ per mile	Cycling facilities with lower stress have higher value
Amenities	Number and type of Amenities	\$ per feature on facility	Features include amenities such as benches, signage, lighting, etc.
Health benefits (personal)	Average miles of active mode traveled	\$ in reduced health risk	\$ accounts for reduced health risk
Health benefits (professional)	Average miles of active mode traveled - commuting	\$ in reduced absentee	\$ accounts for higher productivity
Property Value	# of properties located near facility	\$ premium value for access	\$ depends on site-specific analysis
Vehicle Use Benefits	Number of avoided vehicle trips	\$ average cost of vehicle trips	\$ obtained from vehicle analysis

Journey Quality Benefit Comparison

- Value of cycling trip depends on type of facility
- More separation = more value
- Cycling path & no crossings = 6.7x “sharrow”

	USDOT BCA Guidance (2026)	
Facility Type	Recommended Value per Cycling Mile (2024 \$)	Multiple of Value Above Sharrow
Cycling Path with At-Grade Crossings	\$1.76	5.33
Cycling Path with no At-Grade Crossings	\$2.21	6.70
Dedicated Cycling Lane	\$2.09	6.33
Cycling Boulevard/“Sharrow”	\$0.33	
Separated Cycle Track	\$2.09	6.33

Cycling Path



Dedicated Cycling Lane



Cycling Boulevard / “Sharrow”



Separated Cycle Track



Complete Streets and Property Value – Results of a Recent Analysis

Complete Streets as a Redevelopment Strategy

Arthur C. Nelson
Robert Hibberd
University of Arizona

- Survey of Complete Street projects
- Overall, Constituting less than six-tenths of one percent of their central county urbanized land areas between 2013 and 2019
- Evaluate pre- vs. post- economic activity in :
 - Increased jobs, people, and households
 - Improved jobs-housing balance; increased commuting via transit, walking, and biking; working from home; and increased multifamily residential rents with respect to proximity, meaning that people are more willing to pay to be close to Complete Streets.
- Redevelopment benefits = 10x
 - Complete Streets cost about \$600 million to build (\$ 2023)
 - Redevelopment estimated to be \$6 billion in growth

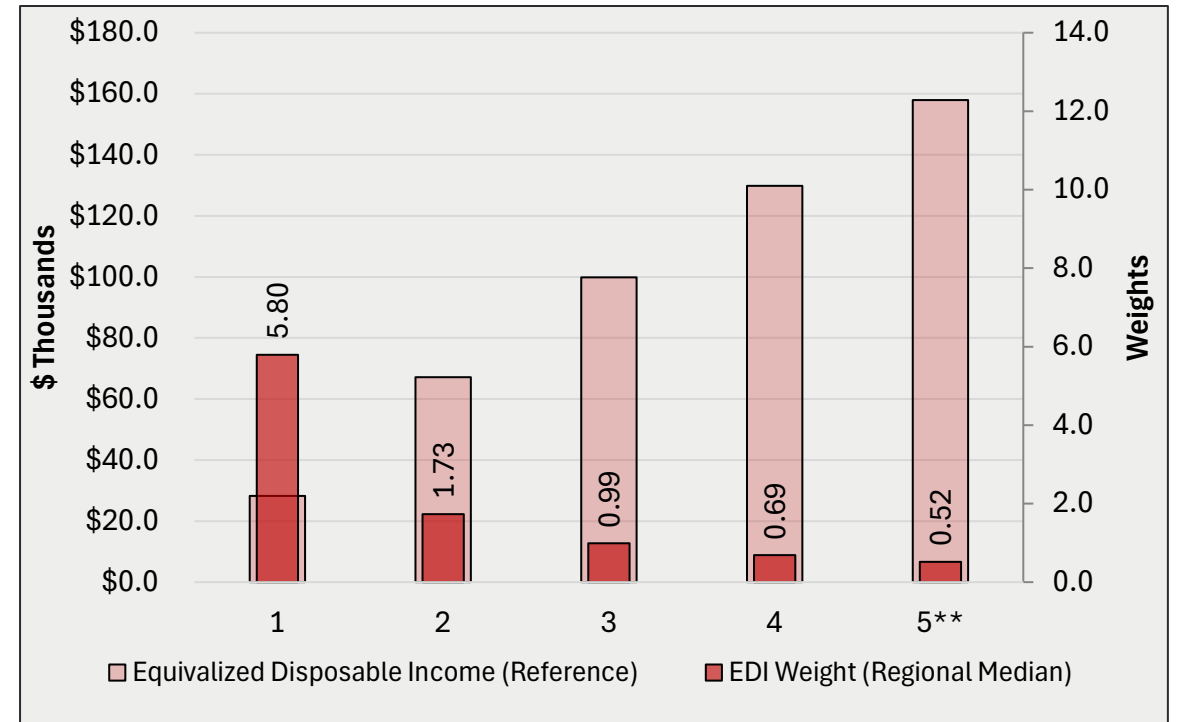
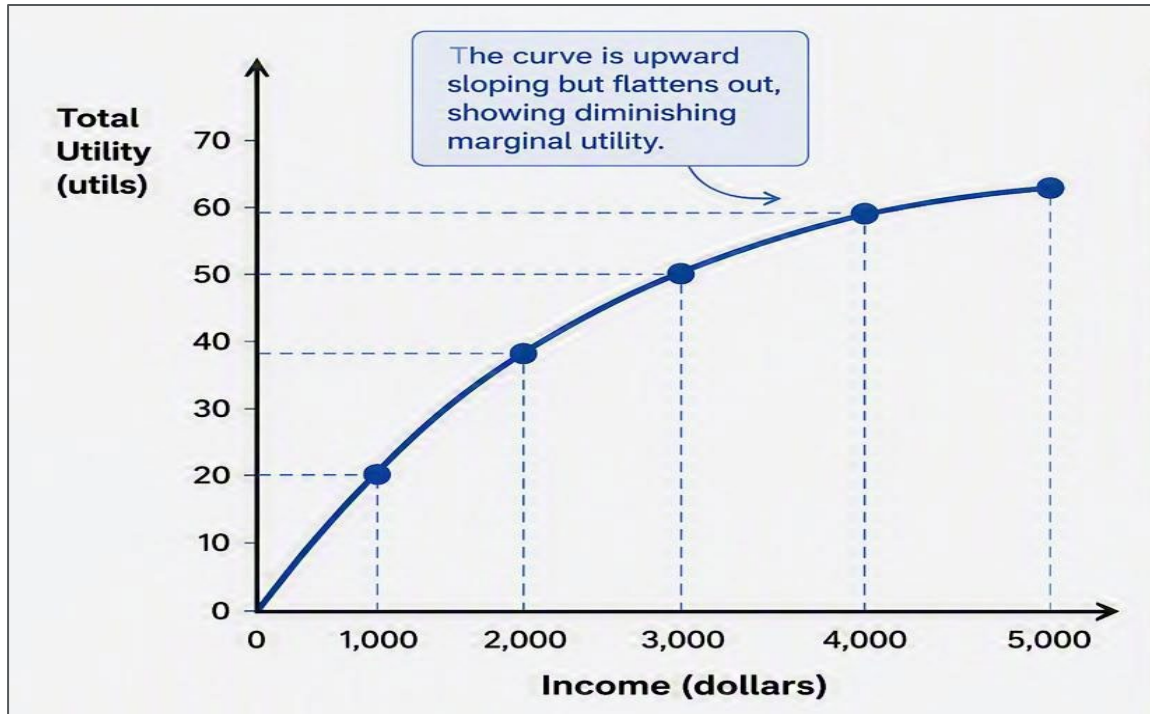
Metropolitan Areas From Which Complete Streets Were Selected for Analysis



Source: Authors

Distributional Analysis of Benefits - *A Total Value Approach*

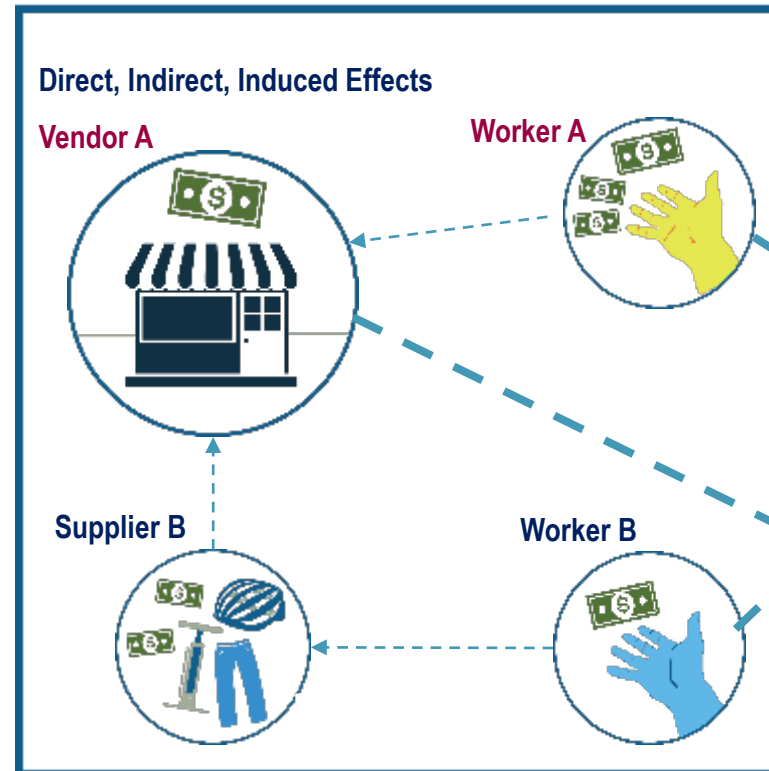
- New approach account for differences in who benefits and by how much
- Used weights to represent differences in utility value of outcomes
- Weights directly related to the incomes of beneficiaries
- Higher weights and higher relative benefits at low incomes
- Results can be produced for comparison with standard BCA



Economics Impact Analysis

Economic Impact Analysis of Transportation Projects

- Macro multiplier of spending
- Change in demand / supply
- Economic impacts separate from benefit-cost analysis
- Total = Direct + Indirect + Induced
- Measures of impact:
 - Labor income
 - Employment
 - Output
 - Gross Regional Product
 - Tax revenue



Economic Impact Metrics



Labor Income

Employee compensation (wages, salaries, and benefits) and self-employed income.



Employment

The number of jobs created for a full year.



Industry Output

The total volume of sales added to the local economy.

Evidence of Active Mode User Spending

Economic impacts on local businesses of investments in bicycle and pedestrian infrastructure: a review of the evidence

(Jamey M. B. Volker & Susan Handy, 2021)

- Evaluated whether active transportation could have **negative impact** on businesses
- Identified >90 studies
- Active travel facilities have positive or (at least) non-negative economic impacts
- No effect on whether vehicular parking or travel lanes are removed or reduced

Location	Spending per Trip	Spending per Month
Downtown San Francisco, Bent and Singa (2009)	Walk: \$47; Bike/Taxi/Other: \$62; Auto: \$69	Walk: \$291; Bike/Taxi/Other: \$308; Auto: \$318
Portland Metro - Restaurants, Clifton et al. (2013)	Walk: \$22.30; Bike: \$16.90; Transit: \$19.00; Auto: \$19.98	Not reported
Portland Metro - Bars, Clifton et al. (2013)	Walk: \$31.42; Bike: \$36.61; Transit: \$35.86; Auto: \$57.39	Not reported
Portland Metro – Supermarkets. Clifton et al. (2013)	Walk: \$32.01; Bike: \$48.40; Transit: \$49.39; Auto: \$40.06	Not reported
Downtown Davis – Retail, Handy (2014)	Bike: \$59.16; Auto: \$53.83	Bike: \$248.62; Auto: \$182.10
Columbus Avenue, San Francisco, San Francisco Transportation Authority (2010)	Walk: \$36; Bike/Taxi/Other: \$41; Auto: \$52	Walk: \$328; Bike/Taxi/Other: \$320; Auto: \$267

Economic Impacts of Complete Streets:

Review of Anecdotal Evidence

[SGA-Complete-Streets-Stronger-Economies Web.pdf](#)

▪ Cost savings

- Gov. Hwy Safety: Ped. Fatalities > \$10B annually
- PennDOT: traffic crashes > \$2,000 per capita in PA.
- Lack of activity = \$200 billion annually in healthcare

▪ Employment

- Multi-location survey: Complete Streets areas added jobs 22 percent faster than elsewhere in the county.

▪ Number of Businesses

- New York City: Open Streets Program have lower vacancy rates than the citywide rate.
- North Carolina: the number of vacant storefronts and apartments downtown dropped from 33 to three.

• Property Value

- National Association of Realtors: walkability of places commands premium price following street improvements.

• Sales

- Seattle, WA: a pilot project to pedestrianize Pike Place Market boosted sales by 6.5 percent.
- Waterbury, VT: restaurant meal sales increased by 26 percent following a Main Street reconstruction project.

○ Tax Revenue

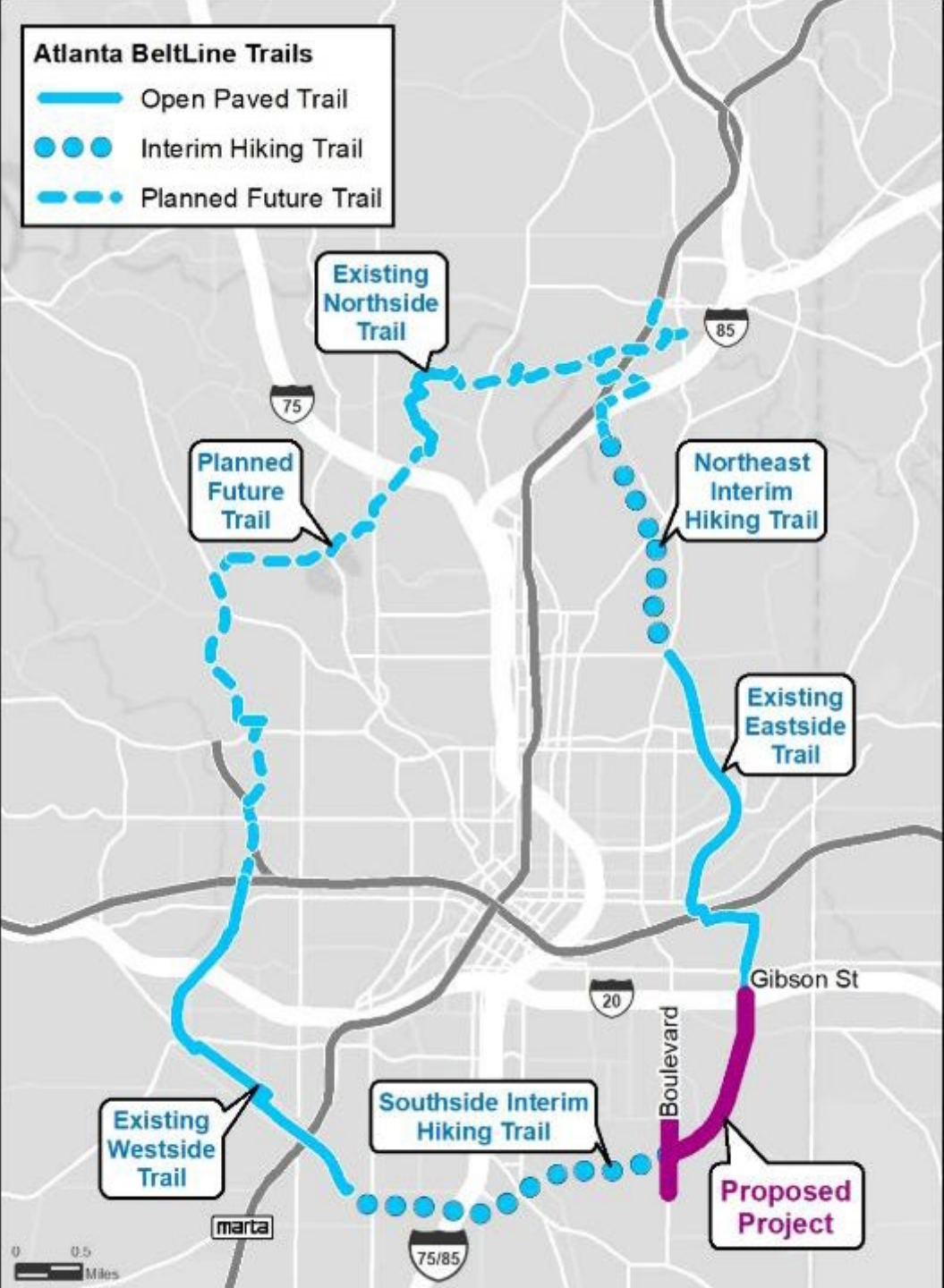
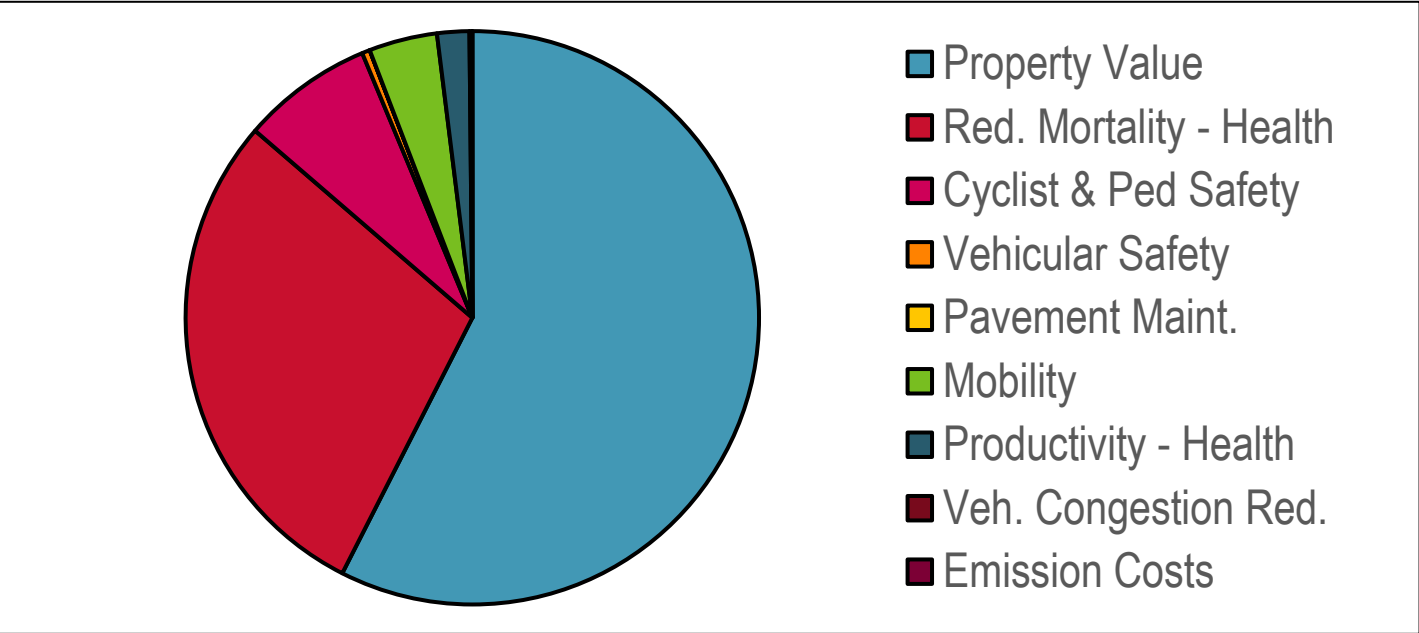
- Lancaster, CA: tax revenues increased by 96 percent.
- Various cities, MN: Complete Streets projects resulted in significantly higher property taxes.

Project Examples

Atlanta Beltline

- Long-term project to combine rails-to-trails with road network
- Funded separately by segment, incrementally addressing gaps
- Proposed southside project ~ 2 miles

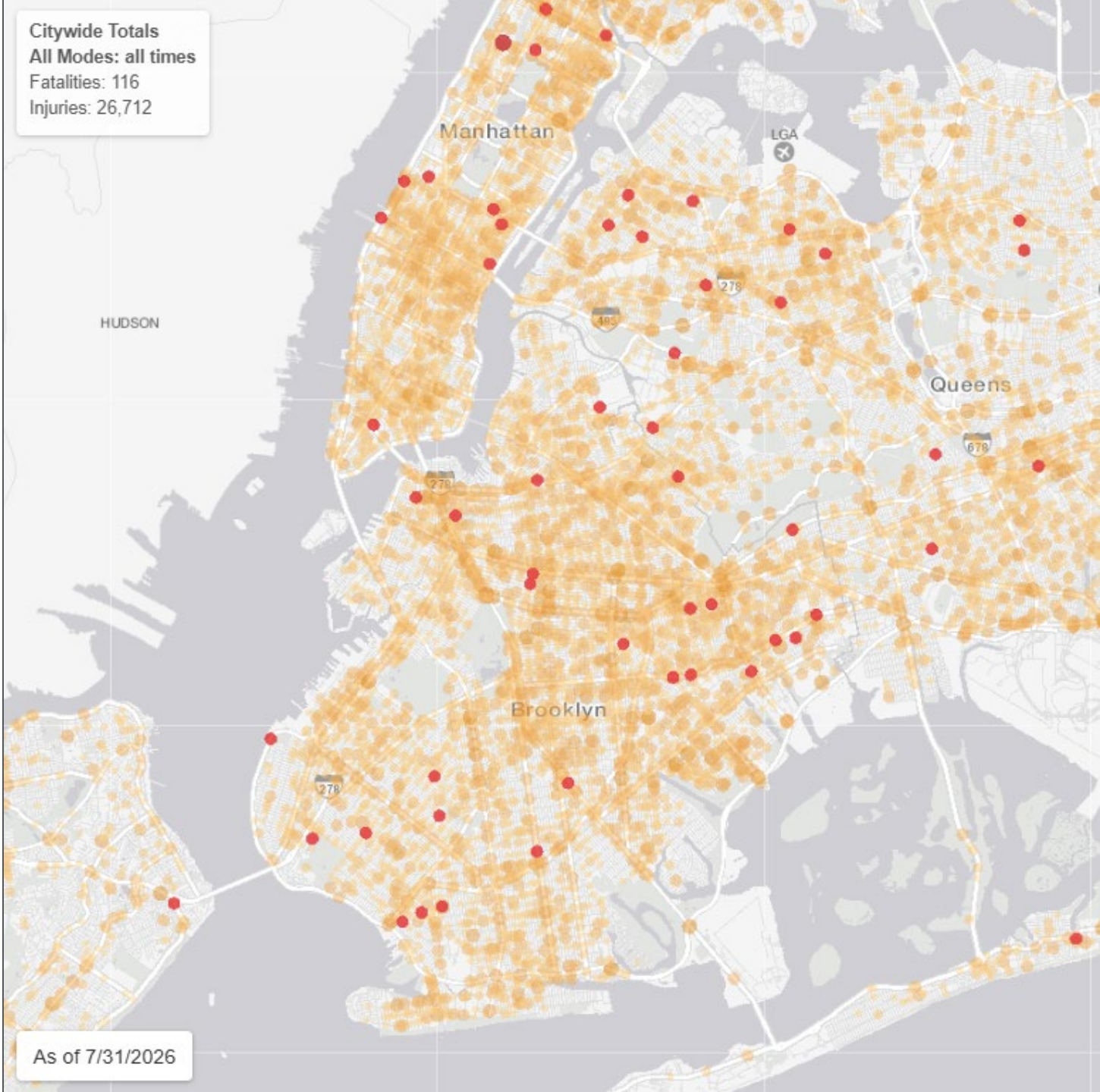
Project Evaluation Metric – Southside Trail	Standard BCA
Total Discounted Benefits	\$116.30
Total Discounted Costs (with Residual Value)	\$30.61
Net Present Value	\$85.69
Benefit / Cost Ratio	3.60



NYC Vision Zero

- NYC embarked on program to improve safety at specific high-risk intersections
- Measures included improved crossing, signals, others
- Benefits primarily involved reduced risk of vehicle – pedestrian collisions, based on engineering measures

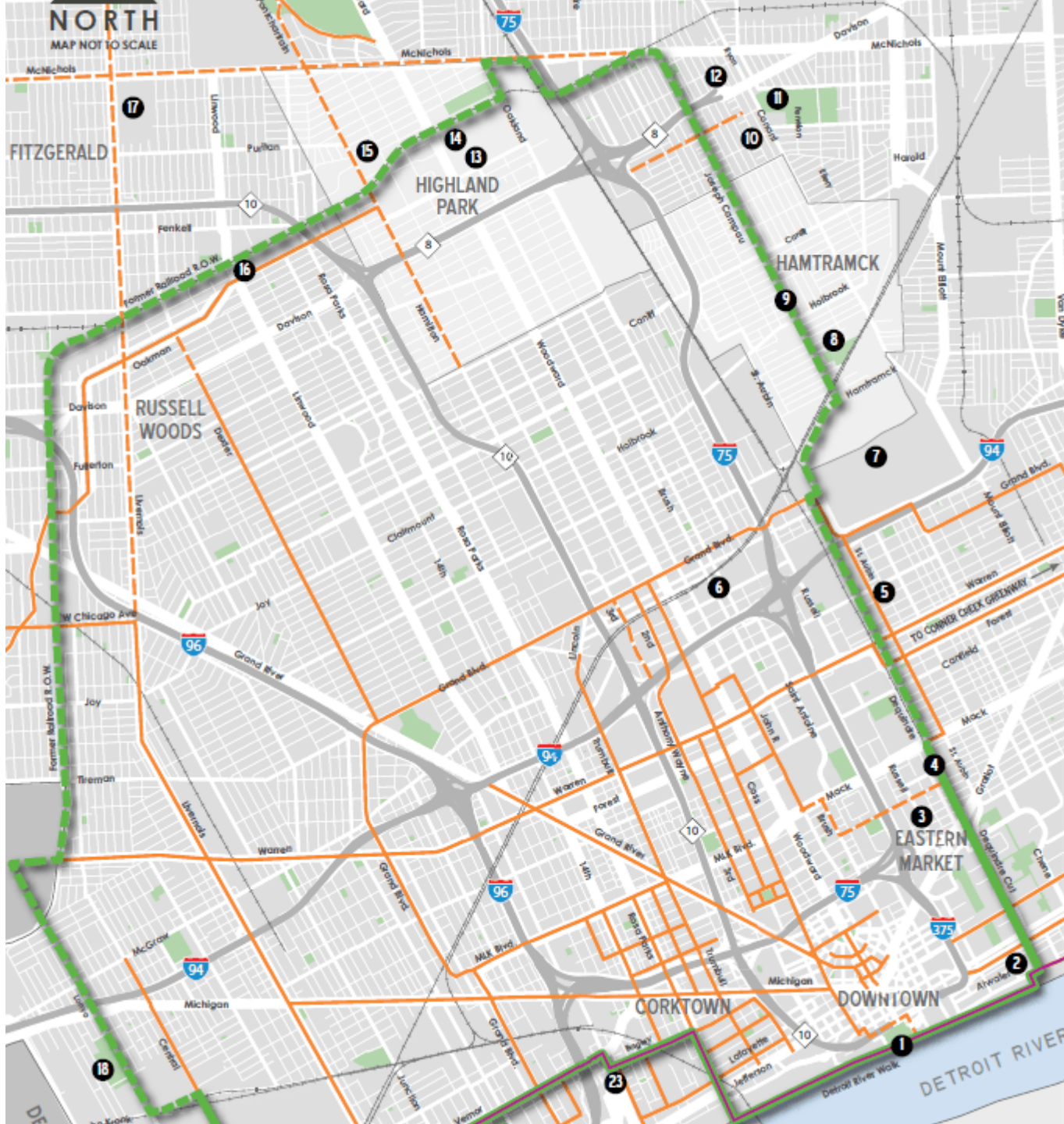
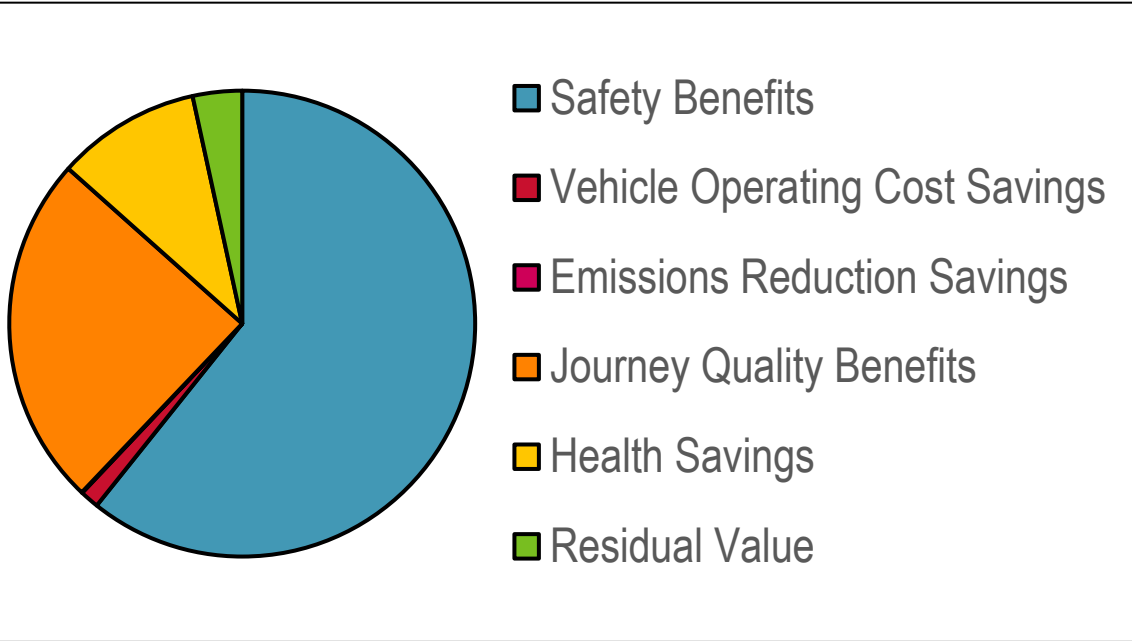
	Standard BCA
(Total) Safety Benefits	\$38.9
Total Costs	\$16.8
Net Present Value	\$22.1
Benefit/Cost Ratio	2.32



Detroit Greenway (Westside)

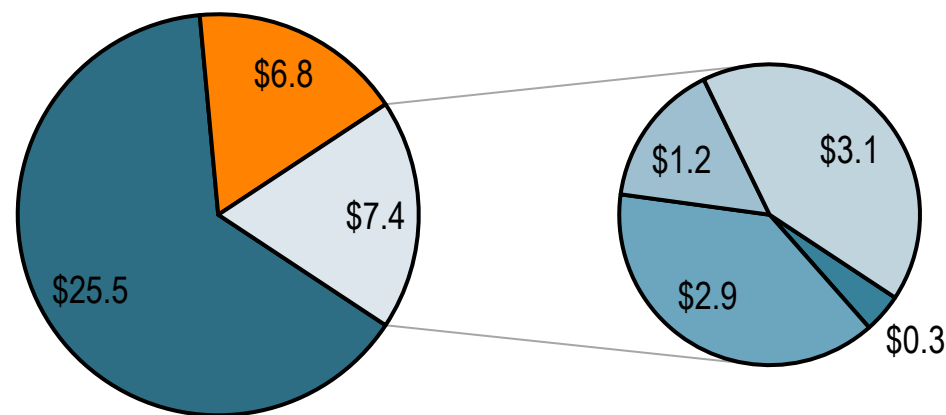
- Project scope: Westside section of loop trail
- Length of improvement = 6 miles
- Improves connectivity via sharrow and separated trail

	Standard BCA	Weighted BCA
Total Benefits	\$25.66	\$76.71
Total Costs	\$37.78	\$37.78
Net Present Value	-12.12	38.93
Benefit/Cost Ratio	0.68	2.03

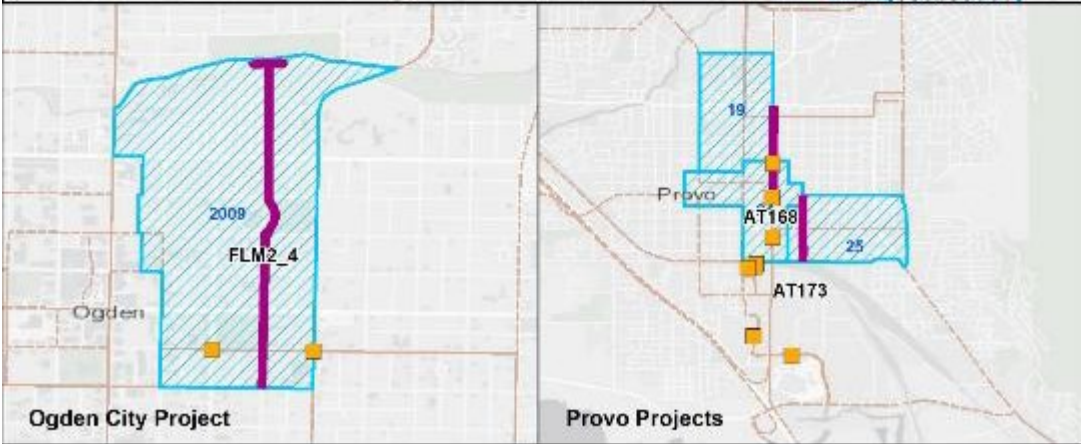
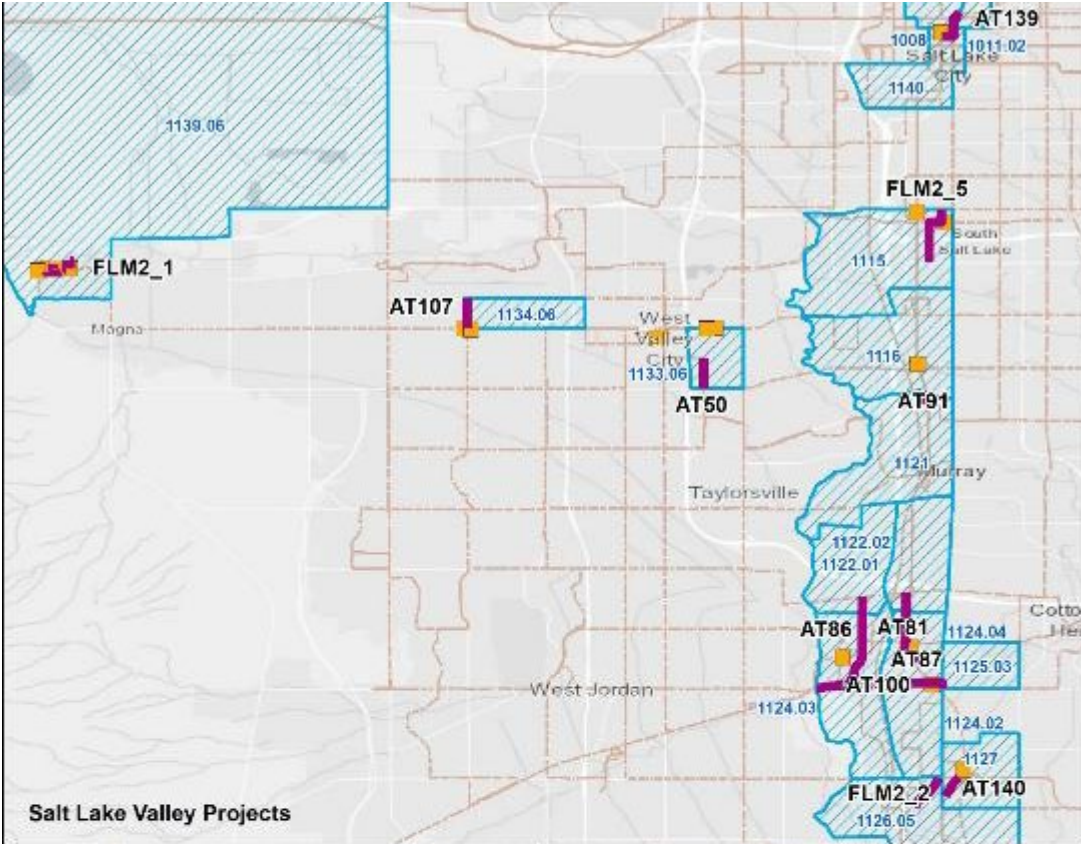


First/Last Mile Connections: Improving Communities' Quality of Life (UDOT)

- 15 critical active transportation improvements to serve 10 light rail stations and 13 bus stops
- Multi-modal benefits
 - Measures increased transit demand
 - Improved journey quality and safety for active transportation



- Accident Cost Savings
- Active Transportation Benefits
- External Highway Use
- Environmental Sustainability Benefits
- Travel Time Savings
- Residual Value of Assets



Group Questions

■ Scoping

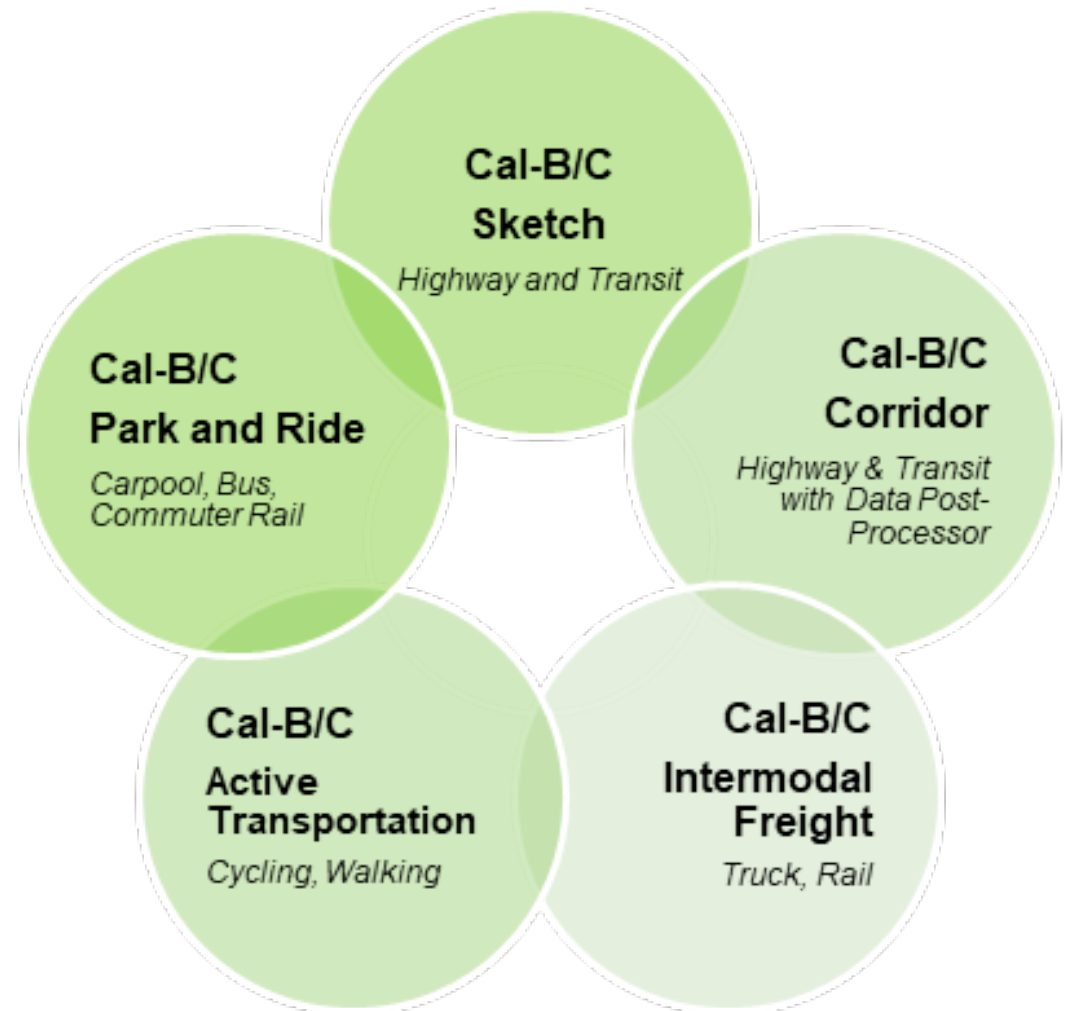
- How would benefit-cost analysis support decisions?
- What are other important economic measures?
- How would results be integrated with existing planning and communication approaches?



Caltrans Cal-B/C Models

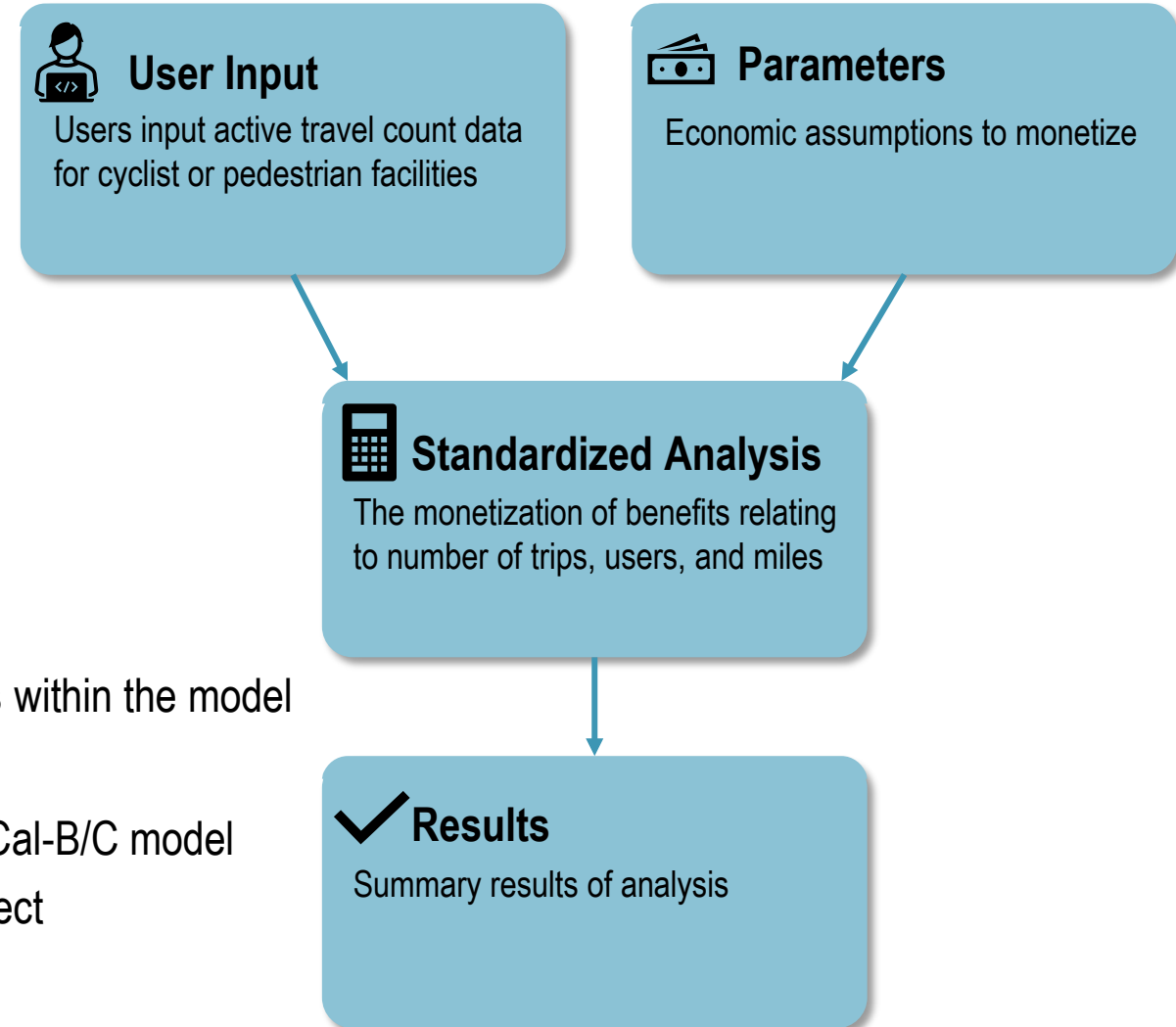
Introduction to Cal-B/C Suite of Tools

- Models initiated in 1980s, regularly updated
- Designed for CA conditions and adaptable
- Used by Caltrans, available to all
- Individual tools
 - **Sketch:** Highway and transit projects
 - **Park and Ride:** Park-and-ride lot projects
 - **Active Transportation:** Active transportation projects that improve travel options and conditions for cyclists and pedestrians
 - **Intermodal Freight:** Intermodal freight projects for bulk/containerized shipments
 - **Corridor:** Post-processor, BCA tool for preparing economic analyses of highway and transit projects



Structure of Cal-B/C Tools

- User input across all Cal-B/C
 - Project Types
 - Project Location
 - User Trip Data
 - Crash or Accident Rates
 - Project Improvements (Facility or Safety)
- Parameters
 - USDOT, OMB, NHTS, NCHRP, etc.
- Standardized Analysis
 - The user entries of trips build the inputs in the calculation of benefits within the model
- Results
 - A summarized collection of results by benefit type, unique for each Cal-B/C model
 - Health and journey quality most aligned to individuals using the project



Is Cal-B/C AT the right tool for you?

- Evaluates projects for active transportation
 - **Infrastructure:** Capital investments on facilities, intersection/signal improvement, and other physical amenities
 - **Non-infrastructure:** Educational and promotional initiatives to encourage ridership and safety
- Modes: **bicycles and pedestrians**
- Applicable project context
 - **Upgraded facility:** intersection improvement, bike lane improvement
 - **New facility:** new shared use path, new dedicated bike lane
- Location
 - **Safe Routes To School (SR2S):** Encourage children walking or bicycling to school by improving safety
 - Non-Safe Routes To School (SR2S): Broadly encourages active transportation or improves safety of existing active transportation
- Can be used in conjunction with other Cal-B/C tools to evaluate AT components of larger projects



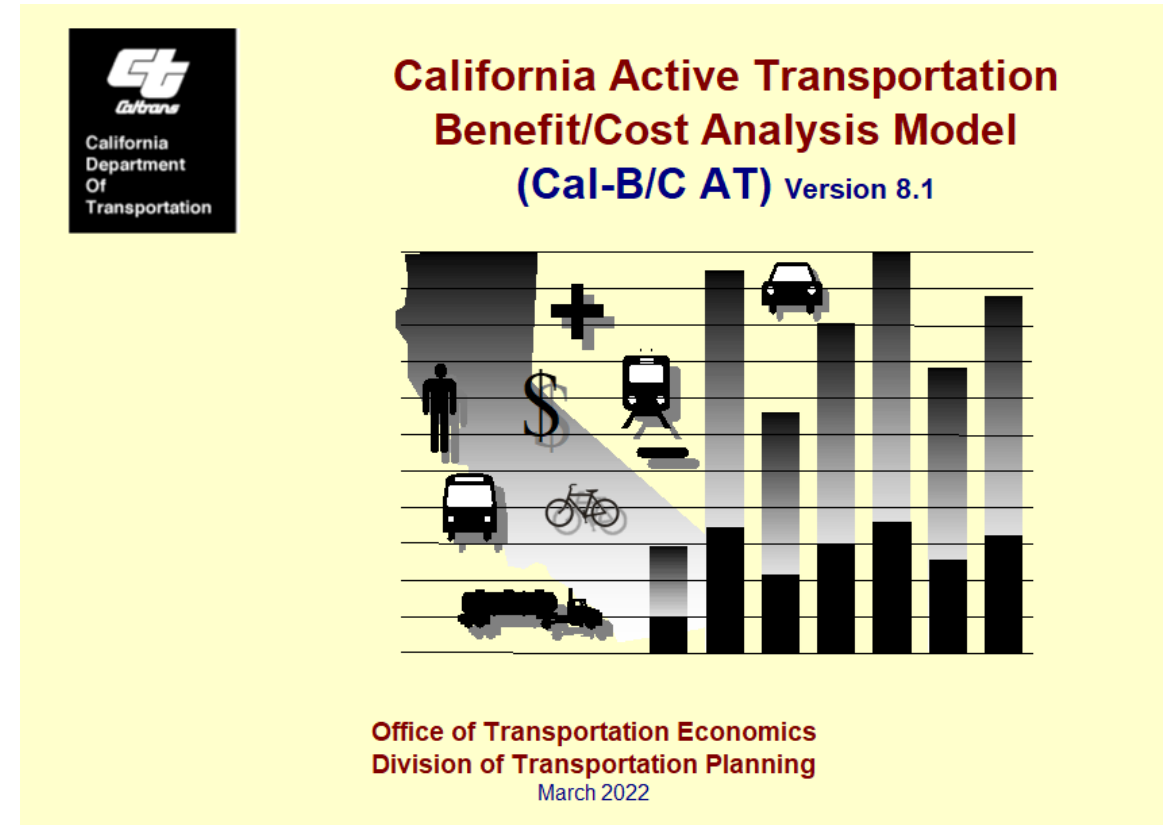
Source: <http://tinyurl.com/q8bhjss>

*Shift To Model and Website
Walk through PDF*

[*caltrans website*](#)

Overview of Cal-B/C Active Transportation

- Part of larger effort to include **bicycle and pedestrian modes** in Cal-B/C suite
- Designed to meet Active Transportation Program (ATP) Guidelines
- Set up as an **interconnected**, multi-sheet **spreadsheet**
 - 16 worksheets in total, including title page shown at right
 - **Project Information** and **Non-Infrastructure Program Information** worksheets are primary locations for data entry
 - BCA results presented in the **Results** worksheet



Overview of Cal-B/C Active Transportation

■ Infrastructure Project portion of the tool

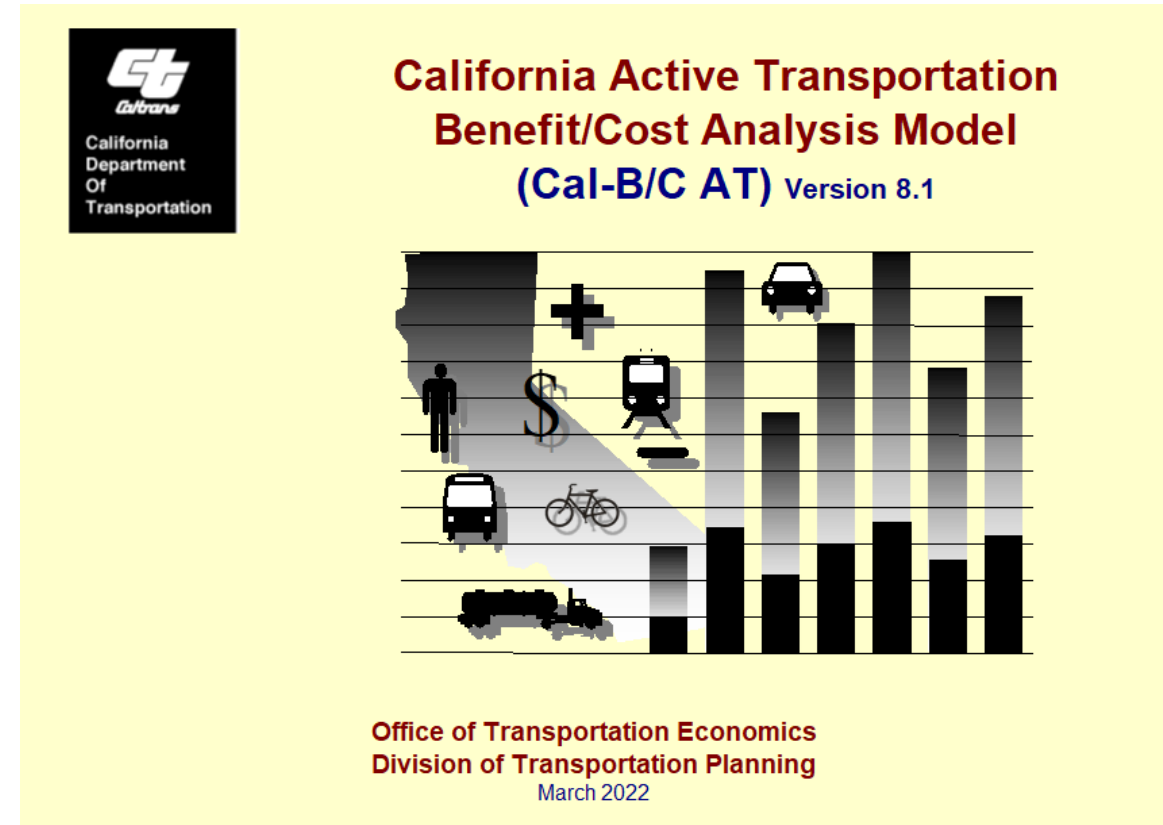
- Based on a benefit-cost method, generally comparable to approach and results in other tools

■ Estimates **five** categories of **user benefits**:

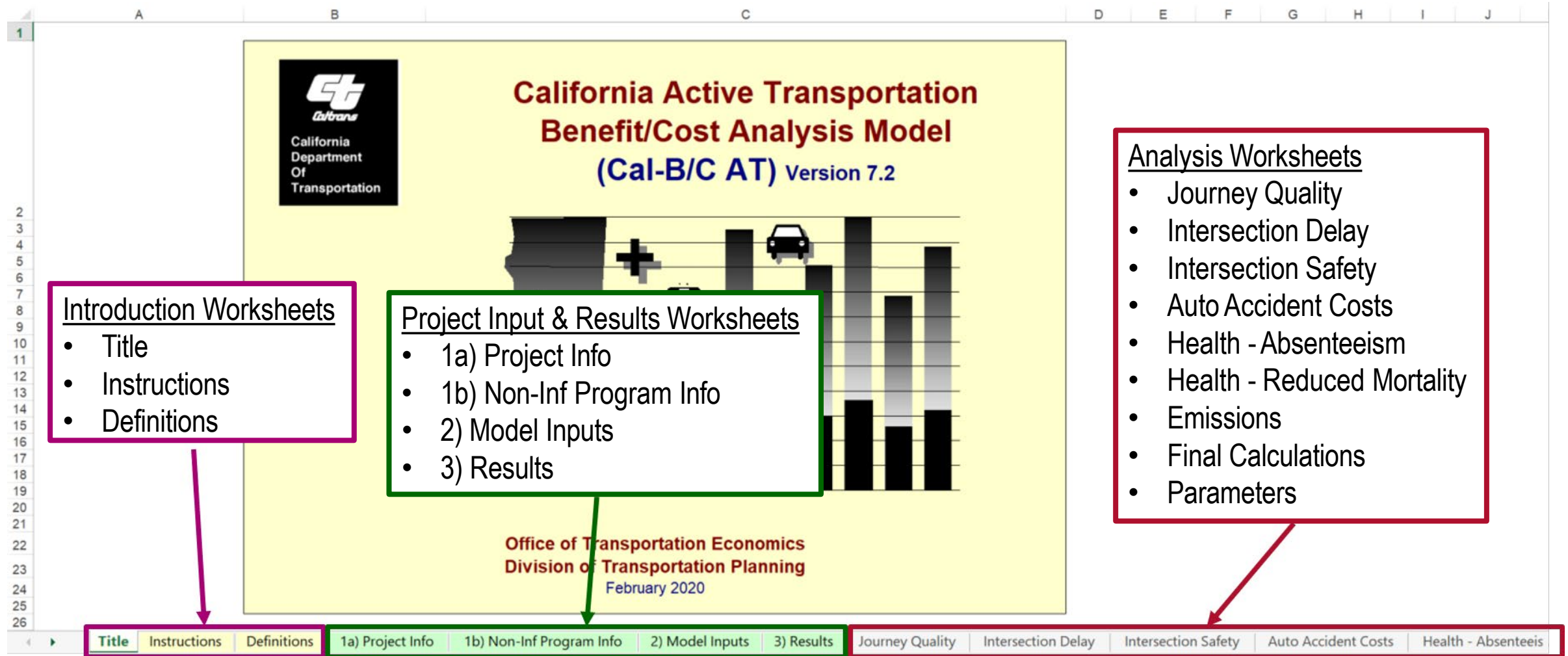
- Journey Quality
- Additional delay savings
- Additional safety benefits
- Health benefits
- Emission cost savings

■ Non-Infrastructure Program portion of the tool

- Based on a multi-criteria analysis approach, so the benefits of this portion are scored but not monetized



Worksheet Layout in Cal-B/C Active Transportation



Project Information Worksheet (1a)

Section 1D: General User Characteristics

Section 1H: Data Checks

Section 1A: Project and Site Characteristics

Section 1B: Existing Segment Improvements and Trip Volume

Section 1C: Intersection Improvements

Section 1E: New Facility Improvements and Trip Volume

Section 1F: Project Costs and Requested Funds

Section 1G: Program Costs and Requested Funds

Project Information Worksheet Tab

District: HQ **EA:** FPMO **PROJECT:** Hypothetical Project

1A PROJECT AND SITE CHARACTERISTICS

Type of Project: Existing facility upgrade only = 1
New facility only, no existing facility work = 2
Existing facility upgrade and new facility extension = 3

Total Project Length: Total Existing Facility Length (miles) OK
Total New Facility Length (miles) OK

Characteristics: Project Location (enter 1 for So. Cal., 2 for No. Cal., or 3 for rural)
Safe Route to School? (enter 1 for Yes, 0 for No)
Programmatic Initiatives? (enter 1 for Yes, 0 for No)
Construction Length of Construction Period (years) OK

1B EXISTING SEGMENT IMPROVEMENTS AND TRIP VOLUME

Improvement Characteristics: Existing Facility Length, if Applicable Class No Build Build Project Length Data Check

Bike Paths (miles) I II III IV OK
Bike Lanes (miles) I II III IV OK
Bike Route (miles) I II III IV OK
Separated Bikeways, Cycle Tracks (miles) I II III IV OK

Pedestrian Improvements: Street Lighting, Curb Level, Crowding, Pavement Evenness, Information Panels, Benches, Directional Signage

Trip Data - Adults: Cycling, Daily Trips - Current, Projected Annual Growth Rates from Year 1 (1%)
Daily Trips - Year 1 (post-construction)
Daily Trips - Year 20 (post-construction)

Pedestrian: Daily Trips - Current, Projected Annual Growth Rates from Year 1 (1%)
Daily Trips - Year 1 (post-construction)
Daily Trips - Year 20 (post-construction)

Trip Data - Children - SRTS: Cycling, Daily Trips - Current, Projected Annual Growth Rates from Year 1 (1%)
Daily Trips - Year 1 (post-construction)
Daily Trips - Year 20 (post-construction)

Pedestrian: Daily Trips - Current, Projected Annual Growth Rates from Year 1 (1%)
Daily Trips - Year 1 (post-construction)
Daily Trips - Year 20 (post-construction)

1C INTERSECTION IMPROVEMENTS - TIME SAVINGS AND ACCIDENT REDUCTION DATA

Reduced Delay Due to Intersection Improvements: Time Savings Parameters
Number of Improved Intersections
Time Savings per Improved Intersection (min.)
Intersection improvements on SRTS? (enter 1 for Yes, 0 for No)

Accident Rate - Current Conditions: Cyclists, Number of Years of Data, Count (No.), Rate per Year

1D GENERAL USER CHARACTERISTICS (BASED ON PROJECT LOCATION)

Cycling: Trip Purpose, Commuting Trip Purpose (1%), Recreational Trip Purpose (1%), Other Destination Trip Purpose (1%)
General Trip Characteristics: Overall Average Distance Traveled/ Trip (mi), Children - SRTS - Distance Traveled/ Trip (mi)

Pedestrian: Trip Purpose, Commuting Trip Purpose (1%), Recreational Trip Purpose (1%), Other Destination Trip Purpose (1%)
General Trip Characteristics: Overall Average Distance Traveled/ Trip (mi), Children - SRTS - Distance Traveled/ Trip (mi)

1E NEW FACILITY IMPROVEMENTS AND TRIP VOLUME

Improvement Characteristics: New Facility Length, No Facility, Bike Paths (miles), Bike Lanes (miles), Bike Route (miles), Separated Bikeways, Cycle Tracks (miles)
Pedestrian Improvements: Street Lighting, Curb Level, Crowding, Pavement Evenness, Information Panels, Benches, Directional Signage

Trip Data - Adults: Cycling, Daily Trips - Current, Projected Annual Growth Rates from Year 1 (1%)
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Daily Trips - Year 1 (post-construction)
Daily Trips - Year 20 (post-construction)

Pedestrian: Daily Trips - Current, Projected Annual Growth Rates from Year 1 (1%)
Daily Trips - Year 1 (post-construction)
Daily Trips - Year 20 (post-construction)

1F PROJECT COSTS AND REQUESTED FUNDS (enter in thousands of dollars)

Year Construction Years Project Support R/W Construction Main Op Rehab. TOTAL COSTS (in dollars) Constant Dollars Present Value

Infrastructure Program Costs: \$0 \$0
Annual Infrastructure D&M Costs: \$0 \$0
ATP REQUESTED FUNDS: \$0 \$0

1G PROGRAM COSTS AND REQUESTED FUNDS (enter in thousands of dollars)

Year Construction Years Project Support R/W Construction Main Op Rehab. TOTAL COSTS (in dollars) Constant Dollars Present Value

Non-Infrastructure Program Costs: \$0 \$0
Annual Non-Infrastructure D&M Costs: \$0 \$0
ATP REQUESTED FUNDS: \$0 \$0

1H DATA CHECKS - PROJECT LENGTH, DAILY TRIPS

No Build Project Length Build Project Length
Existing Facility Length Check OK OK
New Facility Length Check OK OK
Existing Facility Users NA NA
New Facility Users NA NA
Existing Facility Characteristics Safety Measures - Existing only OK

Project Information

Project Information Worksheet (1a)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S																																										
District: HQ				EA:																																																								
PROJECT: Hypothetical Project				PPNO:																																																								
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- Optional, input unique project identifiers including: Caltrans District, Project Name (w/ route number and postmiles), Expenditure Authorization (EA) number, Planning and Programming Number (PPNO)
- Detailed project description with route and postmile assists with accountability (e.g., Bond Accountability Report)

1A) Project and Site Characteristics

Type of Project

- Existing facility upgrade, new facility, or both
 - Used to determine which benefits are calculated and how
 - Project Information in Cal-B/C AT is generally separated for existing and new facilities

Total Project Length (miles)

■ Existing facility length

■ New facility length

- Data checks confirm that data entry is internally consistent
 - Example: Type of project entry is consistent with the project length entries

1A
PROJECT AND SITE CHARACTERISTICS

Type of Project	
Existing facility upgrade only = 1	
New facility only, no existing facility work = 2	
Existing facility upgrade and new facility extension = 3	
Total Project Length	
Total Existing Facility Length (miles)	
Total New Facility Length (miles)	
Characteristics	
Project Location (enter 1 for So. Cal., 2 for No. Cal., or 3 for rural)	
Safe Route to School? (enter 1 for Yes, 0 for No)	
Programmatic Initiatives? (enter 1 for Yes, 0 for No)	
Construction	
Length of Construction Period (years)	

Project Type Data Check

OK

OK

Constr. Years Data Check

OK

1A) Project and Site Characteristics (cont.)

Site Characteristics

Project Location

- Used to estimate emission benefits (emission cost parameters vary by region)

Safe Route to School? (Y/N)

Programmatic Initiatives? (Y/N)

- Non-infrastructure components

Length of Construction Period

- Years needed to construct project

1A

PROJECT AND SITE CHARACTERISTICS

Type of Project

Existing facility upgrade only = 1

New facility only, no existing facility work = 2

Existing facility upgrade and new facility extension = 3

Total Project Length

Total Existing Facility Length (miles)

Total New Facility Length (miles)

Project Type Data Check

OK

OK

Characteristics

Project Location (enter 1 for So. Cal., 2 for No. Cal., or 3 for rural)

Safe Route to School? (enter 1 for Yes, 0 for No)

Programmatic Initiatives? (enter 1 for Yes, 0 for No)

Construction

Length of Construction Period (years)

Constr. Years Data Check

OK

1B) Existing Segment Improvements and Trip Volume Characteristics

- Infrastructure projects are categorized as one of four bike facility classes
- Existing Facility Length (miles) by class**
 - Bike Paths*
 - Bike Lanes*
 - Bike Routes*
 - Separated bikeways and tracks*
- Data check to ensure the data entry matches project length in Section 1A

1B EXISTING SEGMENT IMPROVEMENTS AND TRIP VOLUME					
Improvement Characteristics		Class	No Build	Build	Project Length Data
Existing Facility Length, if Applicable					
Bike Paths (miles)	I				OK
Bike Lanes (miles)	II			4	
Bike Route (miles)	III		4		
Separated Bikeways, Cycle Tracks (miles)	IV				
Total			4	4	
Pedestrian Improvements			Yes = 1 or No = 0		
Street Lighting				1	
Curb Level					
Crowding					
Pavement Evenness				1	
Information Panels					
Benches					
Directional Signage				1	
Trip Data - Adults					
Cycling					
Daily Trips - Current			151		
Projected Annual Growth Rates from Year 1 (%)			0.5%	2.0%	
Daily Trips - Year 1 (post-construction)			153	157	
Daily Trips - Year 20 (post-construction)			169	233	
Pedestrian					
Daily Trips - Current					
Projected Annual Growth Rates from Year 1 (%)					
Daily Trips - Year 1 (post-construction)			0	0	
Daily Trips - Year 20 (post-construction)			0	0	
Trip Data - Children - SRTS					
Cycling					
Daily Trips - Current			18		
Projected Annual Growth Rates from Year 1 (%)			0.5%	2.0%	
Daily Trips - Year 1 (post-construction)			18	19	
Daily Trips - Year 20 (post-construction)			20	28	
Pedestrian					
Daily Trips - Current			24		
Projected Annual Growth Rates from Year 1 (%)			0.5%	2.0%	
Daily Trips - Year 1 (post-construction)			24	25	
Daily Trips - Year 20 (post-construction)			27	37	

1B) Existing Segment Improvements and Trip Volume – Improvement Characteristics (cont.)

Pedestrian Improvements

- Yes = 1; Leave blank if “No”
- Identifies pedestrian improvement project components, which contribute to Journey Quality benefits
 - *Street lighting*
 - *Curb level*
 - *Crowding*
 - *Pavement evenness*
 - *Information Panels*
 - *Benches*
 - *Directional Signage*

1B EXISTING SEGMENT IMPROVEMENTS AND TRIP VOLUME				
Improvement Characteristics Existing Facility Length, if Applicable	Class	No Build	Build	Project Length Data
Bike Paths (miles)	I			OK
Bike Lanes (miles)	II		4	
Bike Route (miles)	III	4		
Separated Bikeways, Cycle Tracks (miles)	IV			
Total		4	4	
Pedestrian Improvements		Yes = 1 or No = 0	Yes = 1 or No = 0	
Street Lighting			1	
Curb Level				
Crowding				
Pavement Evenness			1	
Information Panels				
Benches				
Directional Signage			1	
Trip Data - Adults				
Cycling				
Daily Trips - Current		151		
Projected Annual Growth Rates from Year 1 (%)		0.5%	2.0%	
Daily Trips - Year 1 (post-construction)		153	157	
Daily Trips - Year 20 (post-construction)		169	233	
Pedestrian				
Daily Trips - Current				
Projected Annual Growth Rates from Year 1 (%)				
Daily Trips - Year 1 (post-construction)		0	0	
Daily Trips - Year 20 (post-construction)		0	0	
Trip Data - Children - SRTS				
Cycling				
Daily Trips - Current		18		
Projected Annual Growth Rates from Year 1 (%)		0.5%	2.0%	
Daily Trips - Year 1 (post-construction)		18	19	
Daily Trips - Year 20 (post-construction)		20	28	
Pedestrian				
Daily Trips - Current		24		
Projected Annual Growth Rates from Year 1 (%)		0.5%	2.0%	
Daily Trips - Year 1 (post-construction)		24	25	
Daily Trips - Year 20 (post-construction)		27	37	

1B) Existing Segment Improvements and Trip Volume – Trip Data

Trip Data - Adults

- For Cycling and Pedestrian traffic
- *Current Daily Trips*
- *Projected Annual Growth Rates*
 - in No Build and Build scenarios
- *Daily Trips, post-construction*
 - Year 1 and Year 20, No Build and Build scenarios
 - Calculated from above inputs
 - Can be overwritten if better data is available

Trip Data - Children - SRTS

- Same inputs as above
- Only required for SRTS projects

1B EXISTING SEGMENT IMPROVEMENTS AND TRIP VOLUME				
Improvement Characteristics Existing Facility Length, if Applicable	Class	No Build	Build	Project Length Data
Bike Paths (miles)	I			OK
Bike Lanes (miles)	II		4	
Bike Route (miles)	III	4		
Separated Bikeways, Cycle Tracks (miles)	IV			
Total		4	4	
Pedestrian Improvements		Yes = 1 or No = 0	Yes = 1 or No = 0	
Street Lighting			1	
Curb Level				
Crowding				
Pavement Evenness			1	
Information Panels				
Benches				
Directional Signage			1	
Trip Data - Adults				
Cycling				
Daily Trips - Current		151		
Projected Annual Growth Rates from Year 1 (%)		0.5%	2.0%	
Daily Trips - Year 1 (post-construction)		153	157	
Daily Trips - Year 20 (post-construction)		169	233	
Pedestrian				
Daily Trips - Current				
Projected Annual Growth Rates from Year 1 (%)				
Daily Trips - Year 1 (post-construction)		0	0	
Daily Trips - Year 20 (post-construction)		0	0	
Trip Data - Children - SRTS				
Cycling				
Daily Trips - Current		18		
Projected Annual Growth Rates from Year 1 (%)		0.5%	2.0%	
Daily Trips - Year 1 (post-construction)		18	19	
Daily Trips - Year 20 (post-construction)		20	28	
Pedestrian				
Daily Trips - Current		24		
Projected Annual Growth Rates from Year 1 (%)		0.5%	2.0%	
Daily Trips - Year 1 (post-construction)		24	25	
Daily Trips - Year 20 (post-construction)		27	37	

Active Transportation Benefit Categories

- **Journey Quality:** Value of enhanced trip conditions
- **Travel Time Savings (at Intersections):** Estimated by reduced wait times at intersections
- **Safety Benefits (at Intersections, Sidewalks):** Estimated by crash reduction factors for safety countermeasures
- **Auto Accident Cost Savings:** Modal shift from passenger vehicles to active transportation reduces number of accidents
- **Emissions Cost Savings:** Modal shift from passenger vehicles to active transportation reduces pollution
- **Health Benefits:** Reduced absenteeism (short-term health risk), and avoided pre-mature deaths (long-term health risk)

Applicability of Benefits to a Project Depend on Type of Project (Existing & New), Type of Trip (Existing & Induced)

Benefit Categories by Facility Type	Existing Facility Improvement		New Construction	
	Existing Trips	Induced Trips	Existing Trips	Induced Trips
Journey Quality	Yes	Yes	Yes	Yes
Time Savings (at Intersections)	Yes	Yes		
Safety (at Intersections)	Yes	Yes		
Auto Accident Costs and Auto Emissions		Yes		Yes
Health Benefits (Reduced Absenteeism)		Yes (Commuters)		Yes (Commuters)
Health Benefits (Reduced Mortality)		Yes (Age dependent)		Yes (Age dependent)

Reduced Delay Due to Intersection Improvements

Number of Improved Intersections

- Improved intersections in the project area (if applicable to project)

Time Savings per Improved Intersection

- Expected savings in minutes per intersection due to improvements

Intersection improvements on SRTS? (Y/N)

- Yes = 1; Leave blank if "No"

1C INTERSECTION IMPROVEMENTS - TIME SAVINGS AND ACCIDENT REDUCTION DATA		
Reduced Delay Due to Intersection Improvements		
Time Savings Parameters		
Number of Improved Intersections	2	
Time Savings per Improved Intersection (min.)	1	
Intersection improvements on SRTS? (enter 1 for Yes, 0 for No)	1	
Accident Rate - Current Conditions		
Cyclists	Count (No.)	Rate per Year
Number of Years of Data	5.00	
Existing Conditions		
Total Number of Accidents (Tot)	8	1.6
Number of Fatal Accidents (Fat)		0.0
Number of Injury Accidents (Inj)	8	1.6
Number of Property Damage Only (PDO) Accidents		0.0
Annual Growth Rate in Accidents (%/year)		
Pedestrians	Count (No.)	Rate per Year
Number of Years of Data	5.00	
Existing Conditions		
Total Number of Accidents (Tot)	0	0.0
Number of Fatal Accidents (Fat)		0.0
Number of Injury Accidents (Inj)		0.0
Number of Property Damage Only (PDO) Accidents		0.0
Annual Growth Rate in Accidents (%/year)		
Safety Countermeasures (improvements to existing facilities only)		
Signalized Intersection	Yes = 1	
Pedestrian Countdown Signal Heads	1	
Pedestrian Crossing	1	
Advance Stop Bar before Crosswalk		
Install Overpass/Underpass		
Unsignalized Intersection		
Raised Medians/Refuge Islands	1	
Pedestrian Crossing (new signs and markings only)		
Pedestrian Crossing (safety features/curb extensions)		
Pedestrian Signals		
Roadways - relevant for pedestrian improvements, such as sidewalks		
Sidewalk/Pathway (to avoid walking along roadway)		
Pedestrian Crossing (with enhanced safety features)		
Pedestrian Crossing		
Other Reduction Factor Countermeasures		

1C) Intersection Improvements – Accident Rates

For Cyclists

Number of Years of Data

- Years of accident data to be entered

Total Accidents in Existing Conditions

- Fatal, Injury, Property Damage Only

- Enter actual number of accidents in the project area
- Total Number of Accidents (Tot) are calculated as the sum of accidents by type
- Accident rates (per year) = Accidents / Years of data, by type
- Rates can be overridden if better data is available

Annual Growth Rate in Accidents

- Applies to accidents in No Build and Build scenarios

1C
INTERSECTION IMPROVEMENTS - TIME SAVINGS AND ACCIDENT REDUCTION DATA

Reduced Delay Due to Intersection Improvements

Time Savings Parameters

Number of Improved Intersections	2
Time Savings per Improved Intersection (min.)	1
Intersection improvements on SRTS? (enter 1 for Yes, 0 for No)	1

Accident Rate - Current Conditions

Cyclists

	Count (No.)	Rate per Year
Number of Years of Data	5.00	
Existing Conditions		
Total Number of Accidents (Tot)	8	1.6
Number of Fatal Accidents (Fat)		0.0
Number of Injury Accidents (Inj)	8	1.6
Number of Property Damage Only (PDO) Accidents		0.0
Annual Growth Rate in Accidents (%/year)		

Pedestrians

	Count (No.)	Rate per Year
Number of Years of Data	5.00	
Existing Conditions		
Total Number of Accidents (Tot)	0	0.0
Number of Fatal Accidents (Fat)		0.0
Number of Injury Accidents (Inj)		0.0
Number of Property Damage Only (PDO) Accidents		0.0
Annual Growth Rate in Accidents (%/year)		

Safety Countermeasures (improvements to existing facilities only)

Signalized Intersection

	Yes=1
Pedestrian Countdown Signal Heads	1
Pedestrian Crossing	1
Advance Stop Bar before Crosswalk	
Install Overpass/Underpass	

Unsignalized Intersection

Raised Medians/Refuge Islands	1
Pedestrian Crossing (new signs and markings only)	
Pedestrian Crossing (safety features/curb extensions)	
Pedestrian Signals	

Roadways - relevant for pedestrian improvements, such as sidewalks

Sidewalk/Pathway (to avoid walking along roadway)	1
Pedestrian Crossing (with enhanced safety features)	
Pedestrian Crossing	

Other Reduction Factor Countermeasures

	1
--	---

1C) Intersection Improvements – Accident Rates (cont.)

For Pedestrians

- Same inputs as for bicyclists
 - *Number of Years of Data*
 - *Total Accidents (Fatal, Injury, Property Damage Only) in Existing Conditions*
 - *Annual Growth Rate in Accidents*
- Years of data and growth are independent for each mode

NOTE: Current practice at Caltrans and CA agencies refers to vehicular incidents or “accidents” as “collisions” or “crashes.” Current versions of Cal-B/C still refer to collisions/crashes as accidents.

1C INTERSECTION IMPROVEMENTS - TIME SAVINGS AND ACCIDENT REDUCTION DATA		
Reduced Delay Due to Intersection Improvements		
Time Savings Parameters		
Number of Improved Intersections	2	
Time Savings per Improved Intersection (min.)	1	
Intersection improvements on SRTS? (enter 1 for Yes, 0 for No)	1	
Accident Rate - Current Conditions		
Cyclists	Count (No.)	Rate per Year
Number of Years of Data	5.00	
Existing Conditions		
Total Number of Accidents (Tot)	8	1.6
Number of Fatal Accidents (Fat)		0.0
Number of Injury Accidents (Inj)	8	1.6
Number of Property Damage Only (PDO) Accidents		0.0
Annual Growth Rate in Accidents (%/year)		
Pedestrians	Count (No.)	Rate per Year
Number of Years of Data	5.00	
Existing Conditions		
Total Number of Accidents (Tot)	0	0.0
Number of Fatal Accidents (Fat)		0.0
Number of Injury Accidents (Inj)		0.0
Number of Property Damage Only (PDO) Accidents		0.0
Annual Growth Rate in Accidents (%/year)		
Safety Countermeasures (improvements to existing facilities only)		
Signalized Intersection		
Pedestrian Countdown Signal Heads	Yes = 1	
Pedestrian Crossing	1	
Advance Stop Bar before Crosswalk		
Install Overpass/Underpass		
Unsignalized Intersection		
Raised Medians/Refuge Islands		
Pedestrian Crossing (new signs and markings only)	1	
Pedestrian Crossing (safety features/curb extensions)		
Pedestrian Signals		
Roadways - relevant for pedestrian improvements, such as sidewalks		
Sidewalk/Pathway (to avoid walking along roadway)		
Pedestrian Crossing (with enhanced safety features)		
Pedestrian Crossing		
Other Reduction Factor Countermeasures		

1C) Intersection Improvements – Safety Countermeasures

- Yes = 1; Leave blank if “No”
- Identifies safety countermeasures at existing facilities that contribute to bicycle and pedestrian accident cost savings
- **Signalized Intersection**
- **Unsignalized Intersection**
- **Roadways** (pedestrian improvements only)
- **Other Reduction Factor Countermeasures**
- Used in accident cost savings in the Intersection Safety worksheet

1C INTERSECTION IMPROVEMENTS - TIME SAVINGS AND ACCIDENT REDUCTION DATA		
Reduced Delay Due to Intersection Improvements		
Time Savings Parameters		
Number of Improved Intersections	2	
Time Savings per Improved Intersection (min.)	1	
Intersection improvements on SRTS? (enter 1 for Yes, 0 for No)	1	
Accident Rate - Current Conditions		
Cyclists	Count (No.)	Rate per Year
Number of Years of Data	5.00	
Existing Conditions		
Total Number of Accidents (Tot)	8	1.6
Number of Fatal Accidents (Fat)		0.0
Number of Injury Accidents (Inj)	8	1.6
Number of Property Damage Only (PDO) Accidents		0.0
Annual Growth Rate in Accidents (%/year)		
Pedestrians	Count (No.)	Rate per Year
Number of Years of Data	5.00	
Existing Conditions		
Total Number of Accidents (Tot)	0	0.0
Number of Fatal Accidents (Fat)		0.0
Number of Injury Accidents (Inj)		0.0
Number of Property Damage Only (PDO) Accidents		0.0
Annual Growth Rate in Accidents (%/year)		
Safety Countermeasures (improvements to existing facilities only)		
Signalized Intersection	Yes = 1	
Pedestrian Countdown Signal Heads	1	
Pedestrian Crossing	1	
Advance Stop Bar before Crosswalk		
Install Overpass/Underpass		
Unsignalized Intersection		
Raised Medians/Refuge Islands	1	
Pedestrian Crossing (new signs and markings only)		
Pedestrian Crossing (safety features/curb extensions)		
Pedestrian Signals		
Roadways - relevant for pedestrian improvements, such as sidewalks		
Sidewalk/Pathway (to avoid walking along roadway)		
Pedestrian Crossing (with enhanced safety features)		
Pedestrian Crossing		
Other Reduction Factor Countermeasures		

1D) General User Characteristics (Based on Project Location)

- Default Parameters for:
 - Distribution of Trip Purpose
 - Distance traveled
 - For Cyclists and Pedestrians
 - No Build and Build scenarios
- Based on Project Location entry in Section 1A
- Characteristics of facility users are used in estimating facility benefits
- Can be overridden if better data is available
- Refer to Module 5 for discussion of default parameter sources

1D GENERAL USER CHARACTERISTICS (BASED ON PROJECT LOCATION)		
Cycling		
Trip Purpose	No Build	Build
Commuting Trip Purpose (%)	8%	8%
Recreational Trip Purpose (%)	15%	15%
Other Destinations Trip Purpose (%)	77%	77%
General Trip Characteristics		
Overall Average Distance Traveled / Trip (mi)	1.83	1.83
Children - SRTS - Distance Traveled / Trip (mi)	0.88	0.88
Pedestrian		
Trip Purpose		
Commuting Trip Purpose (%)	5%	5%
Recreational Trip Purpose (%)	10%	10%
Other Destination Trip Purpose (%)	85%	85%
General Trip Characteristics		
Overall Average Distance Traveled / Trip (mi)	0.52	0.52
Children - SRTS - Distance Traveled / Trip (mi)	0.46	0.46

1F) Project Costs

- All project costs entered into five cost columns
- Project costs should be entered as incremental rather than total
 - Incremental costs are difference between No Build and Build (No Build = \$0, Build = \$1,000)
- Costs must be entered in thousands of dollars (\$1,000)
- Project costs must be entered in constant dollars, in same year as project start (e.g., if project start year is 2016)
 - Modules 5 and 6a will go into more details about year for current

1F PROJECT COSTS AND REQUESTED FUNDS (enter in thousands of dollars)

Col. no.

Year	Construction Years	DIRECT PROJECT COSTS					TOTAL COSTS (in dollars)	
		Project Support	R / W	Construction	Maint./Op.	Rehab.	Constant Dollars	Present Value
Infrastructure Program Costs								
1	1		\$500.0	\$2,000.0	<-- Must enter a cost		\$2,500,000	\$2,500,000
2	1			\$2,000.0			2,000,000	1,923,077
3	0						0	0
4	0						0	0
5	0						0	0
6	0						0	0
7	0						0	0
8	0						0	0
Annual Infrastructure O&M Costs								
1					\$5		\$5,000	\$4,623
2					\$5		5,000	4,445
3					\$5		5,000	4,274
4					\$5		5,000	4,110
5					\$5		5,000	3,952
6					\$5		5,000	3,800
7					\$5		5,000	3,653
8					\$5		5,000	3,513
9					\$5		5,000	3,378
10					\$5		5,000	3,248
11					\$5		5,000	3,123
12					\$5		5,000	3,003
13					\$5		5,000	2,887
14					\$5		5,000	2,776
15					\$5		5,000	2,670
16					\$5		5,000	2,567
17					\$5		5,000	2,468
18					\$5		5,000	2,373
19					\$5		5,000	2,282
20					\$5		5,000	2,194
Total		\$0	\$500	\$4,000	\$100	\$0	\$4,600,000	\$4,488,415
ATP REQUESTED FUNDS								
Total								

Project Information

1F) Project Costs – Direct Project Costs

Initial Costs

- Project support
- Right-of-way acquisition costs
- Construction costs
- Cal-B/C assumes that all initial project costs are expended by the last year of construction

Subsequent Costs

- Any costs incurred after the project is constructed and open
 - Operating and Maintenance (O&M) costs
 - Rehabilitation costs
- Module 8 discusses project cost sources, including O&M costs

(TF) PROJECT COSTS AND REQUESTED FUNDS (enter in thousands of dollars)

Col. no.

Year	Construction Years	DIRECT PROJECT COSTS					TOTAL COSTS (in dollars)	
		Project Support	R / W	Construction	Maint./ Op.	Rehab.	Constant Dollars	Present Value
Infrastructure Program Costs								
1	1		\$500.0	\$2,000.0	<-- Must enter a cost		\$2,500,000	\$2,500,000
2	1			\$2,000.0			2,000,000	1,923,077
3	0						0	0
4	0						0	0
5	0						0	0
6	0						0	0
7	0						0	0
8	0						0	0
Annual Infrastructure O&M Costs								
1					\$5		\$5,000	\$4,623
2					\$5		5,000	4,445
3					\$5		5,000	4,274
4					\$5		5,000	4,110
5					\$5		5,000	3,952
6					\$5		5,000	3,800
7					\$5		5,000	3,653
8					\$5		5,000	3,513
9					\$5		5,000	3,378
10					\$5		5,000	3,248
11					\$5		5,000	3,123
12					\$5		5,000	3,003
13					\$5		5,000	2,887
14					\$5		5,000	2,776
15					\$5		5,000	2,670
16					\$5		5,000	2,567
17					\$5		5,000	2,468
18					\$5		5,000	2,373
19					\$5		5,000	2,282
20					\$5		5,000	2,194
Total		\$0	\$500	\$4,000	\$100	\$0	\$4,600,000	\$4,488,415
ATP REQUESTED FUNDS								
Total								

1F) Project Costs

- Up to eight (8) years of initial infrastructure project costs allowed
- Costs must be entered for each year to be consistent with “Length of Construction Period” entered in Section 1A
- Following construction, project opens and the 20-year project operating period begins
- Year 1 (Base Year) described in previous slides represented by the “1” under the “Project Open” header

1F PROJECT COSTS AND REQUESTED FUNDS (enter in thousands of dollars)

Col. no.

Year	Construction Years	DIRECT PROJECT COSTS					TOTAL COSTS (in dollars)	
		Project Support	INITIAL COSTS		SUBSEQUENT COSTS		Constant Dollars	Present Value
			B/L/W	Construction	Maint./ Op.	Rehab.		
Infrastructure Program Costs								
1	1		\$500.0	\$2,000.0	<-- Must enter a cost		\$2,500,000	\$2,500,000
2	1			\$2,000.0			2,000,000	1,923,077
3	0						0	0
4	0						0	0
5	0						0	0
6	0						0	0
7	0						0	0
8	0						0	0
Annual Infrastructure O&M Costs								
1					\$5		\$5,000	\$4,623
2					\$5		5,000	4,445
3					\$5		5,000	4,274
4					\$5		5,000	4,110
5					\$5		5,000	3,952
6					\$5		5,000	3,800
7					\$5		5,000	3,653
8					\$5		5,000	3,513
9					\$5		5,000	3,378
10					\$5		5,000	3,248
11					\$5		5,000	3,123
12					\$5		5,000	3,003
13					\$5		5,000	2,887
14					\$5		5,000	2,776
15					\$5		5,000	2,670
16					\$5		5,000	2,567
17					\$5		5,000	2,468
18					\$5		5,000	2,373
19					\$5		5,000	2,282
20					\$5		5,000	2,194
Total		\$0	\$500	\$4,000	\$100	\$0	\$4,600,000	\$4,488,415
ATP REQUESTED FUNDS								
Total								

Project Information

2) Model Inputs

- Number of **trips, users, and miles traveled** by trip purpose
- Estimated based on data entered in Project Information worksheet
- Adjust calculated values if more in-depth data are available
- “Reason for Change” should be specified for any values overridden by user
 - Example: Federal Highway Administration (FHWA) grant reviewers examine these cells closely
 - Users should have citing documents ready if values are overridden

2A ACTIVE TRANSPORTATION DAILY VOLUME INPUTS - CYCLING - Existing Facility Segment

	Calculated by Model	Changed by User	Used for Proj. Eval.	Reason for Change
No Build - Cycling				
Year 1				
Annual Trips - Commuting	0		0	
Annual Trips - Other Destinations	0		0	
Annual Trips - Recreational	0		0	Recreational Users not Included in Benefits
Users - Commuting	0		0	
Users - Other Destinations	0		0	
Users - Recreational	0		0	Recreational Users not Included in Benefits
Total Miles - Commuting	0		0	
Total Miles - Other Destinations	0		0	
Total Miles - Recreational	0		0	Recreational Users not Included in Benefits
Year 20				
Trips - Commuting	0		0	
Trips - Other Destinations	0		0	
Trips - Recreational	0		0	Recreational Users not Included in Benefits
Users - Commuting	0		0	
Users - Other Destinations	0		0	
Users - Recreational	0		0	Recreational Users not Included in Benefits
Total Miles - Commuting	0		0	
Total Miles - Other Destinations	0		0	
Total Miles - Recreational	0		0	Recreational Users not Included in Benefits
Build - Cycling				
Year 1				
Annual Trips - Commuting	0		0	
Annual Trips - Other Destinations	0		0	
Annual Trips - Recreational	0		0	Recreational Users not Included in Benefits
Users - Commuting	0		0	
Users - Other Destinations	0		0	
Users - Recreational	0		0	Recreational Users not Included in Benefits
Total Miles - Commuting	0		0	
Total Miles - Other Destinations	0		0	
Total Miles - Recreational	0		0	Recreational Users not Included in Benefits
Year 20				
Annual Trips - Commuting	0		0	
Annual Trips - Other Destinations	0		0	
Annual Trips - Recreational	0		0	Recreational Users not Included in Benefits
Users - Commuting	0		0	
Users - Other Destinations	0		0	
Users - Recreational	0		0	Recreational Users not Included in Benefits
Total Miles - Commuting	0		0	
Total Miles - Other Destinations	0		0	
Total Miles - Recreational	0		0	Recreational Users not Included in Benefits

2E ACTIVE TRANSPORTATION DAILY VOLUME INPUTS - PEDESTRIAN - Existing Facility Segment

	Calculated by Model	Changed by User	Used for Proj. Eval.	Reason for Change
No Build - Pedestrian				
Year 1				
Annual Trips - Commuting	0		0	
Annual Trips - Other Destinations	0		0	
Annual Trips - Recreational	0		0	Recreational Users not Included in Benefits
Users - Commuting	0		0	
Users - Other Destinations	0		0	
Users - Recreational	0		0	Recreational Users not Included in Benefits
Total Miles - Commuting	0		0	
Total Miles - Other Destinations	0		0	
Total Miles - Recreational	0		0	Recreational Users not Included in Benefits
Year 20				
Annual Trips - Commuting	0		0	
Annual Trips - Other Destinations	0		0	
Annual Trips - Recreational	0		0	Recreational Users not Included in Benefits
Users - Commuting	0		0	
Users - Other Destinations	0		0	
Users - Recreational	0		0	Recreational Users not Included in Benefits
Total Miles - Commuting	0		0	
Total Miles - Other Destinations	0		0	
Total Miles - Recreational	0		0	Recreational Users not Included in Benefits
Build - Pedestrian				
Year 1				
Annual Trips - Commuting	0		0	
Annual Trips - Other Destinations	0		0	
Annual Trips - Recreational	0		0	Recreational Users not Included in Benefits
Users - Commuting	0		0	
Users - Other Destinations	0		0	
Users - Recreational	0		0	Recreational Users not Included in Benefits
Total Miles - Commuting	0		0	
Total Miles - Other Destinations	0		0	
Total Miles - Recreational	0		0	Recreational Users not Included in Benefits
Year 20				
Annual Trips - Commuting	0		0	
Annual Trips - Other Destinations	0		0	
Annual Trips - Recreational	0		0	Recreational Users not Included in Benefits
Users - Commuting	0		0	
Users - Other Destinations	0		0	
Users - Recreational	0		0	Recreational Users not Included in Benefits
Total Miles - Commuting	0		0	
Total Miles - Other Destinations	0		0	
Total Miles - Recreational	0		0	Recreational Users not Included in Benefits

2) Model Inputs, Sections

Cycling Volume Inputs

- 2A) Existing Facility Segment
- 2B) New Facility Segment
- 2C) New Safe Routes To School
- 2D) Existing Safe Routes To School

Pedestrian Volume Inputs

- 2E) Existing Facility Segment
- 2F) New Facility Segment
- 2G) New Safe Routes To School
- 2H) Existing Safe Routes To School

	Calculated by Model	Changed by User	Used for Proj. Eval.	Reason for Change
No Build - Cycling				
Year 1				
Annual Trips - Commuting	0		0	
Annual Trips - Other Destinations	0		0	
Annual Trips - Recreational	0		0	Recreational Users not Included in Benefits
Users - Commuting	0		0	
Users - Other Destinations	0		0	
Users - Recreational	0		0	Recreational Users not Included in Benefits
Total Miles - Commuting	0		0	
Total Miles - Other Destinations	0		0	
Total Miles - Recreational	0		0	Recreational Users not Included in Benefits
Year 20				
Trips - Commuting	0		0	
Trips - Other Destinations	0		0	
Trips - Recreational	0		0	Recreational Users not Included in Benefits
Users - Commuting	0		0	
Users - Other Destinations	0		0	
Users - Recreational	0		0	Recreational Users not Included in Benefits
Total Miles - Commuting	0		0	
Total Miles - Other Destinations	0		0	
Total Miles - Recreational	0		0	Recreational Users not Included in Benefits
Build - Cycling				
Year 1				
Annual Trips - Commuting	0		0	
Annual Trips - Other Destinations	0		0	
Annual Trips - Recreational	0		0	Recreational Users not Included in Benefits
Users - Commuting	0		0	
Users - Other Destinations	0		0	
Users - Recreational	0		0	Recreational Users not Included in Benefits
Total Miles - Commuting	0		0	
Total Miles - Other Destinations	0		0	
Total Miles - Recreational	0		0	Recreational Users not Included in Benefits
Year 20				
Annual Trips - Commuting	0		0	
Annual Trips - Other Destinations	0		0	
Annual Trips - Recreational	0		0	Recreational Users not Included in Benefits
Users - Commuting	0		0	
Users - Other Destinations	0		0	
Users - Recreational	0		0	Recreational Users not Included in Benefits
Total Miles - Commuting	0		0	
Total Miles - Other Destinations	0		0	
Total Miles - Recreational	0		0	Recreational Users not Included in Benefits

	Calculated by Model	Changed by User	Used for Proj. Eval.	Reason for Change
No Build - Pedestrian				
Year 1				
Annual Trips - Commuting	0		0	
Annual Trips - Other Destinations	0		0	
Annual Trips - Recreational	0		0	Recreational Users not Included in Benefits
Users - Commuting	0		0	
Users - Other Destinations	0		0	
Users - Recreational	0		0	Recreational Users not Included in Benefits
Total Miles - Commuting	0		0	
Total Miles - Other Destinations	0		0	
Total Miles - Recreational	0		0	Recreational Users not Included in Benefits
Year 20				
Annual Trips - Commuting	0		0	
Annual Trips - Other Destinations	0		0	
Annual Trips - Recreational	0		0	Recreational Users not Included in Benefits
Users - Commuting	0		0	
Users - Other Destinations	0		0	
Users - Recreational	0		0	Recreational Users not Included in Benefits
Total Miles - Commuting	0		0	
Total Miles - Other Destinations	0		0	
Total Miles - Recreational	0		0	Recreational Users not Included in Benefits
Build - Pedestrian				
Year 1				
Annual Trips - Commuting	0		0	
Annual Trips - Other Destinations	0		0	
Annual Trips - Recreational	0		0	Recreational Users not Included in Benefits
Users - Commuting	0		0	
Users - Other Destinations	0		0	
Users - Recreational	0		0	Recreational Users not Included in Benefits
Total Miles - Commuting	0		0	
Total Miles - Other Destinations	0		0	
Total Miles - Recreational	0		0	Recreational Users not Included in Benefits
Year 20				
Annual Trips - Commuting	0		0	
Annual Trips - Other Destinations	0		0	
Annual Trips - Recreational	0		0	Recreational Users not Included in Benefits
Users - Commuting	0		0	
Users - Other Destinations	0		0	
Users - Recreational	0		0	Recreational Users not Included in Benefits
Total Miles - Commuting	0		0	
Total Miles - Other Destinations	0		0	
Total Miles - Recreational	0		0	Recreational Users not Included in Benefits

Cycling and Pedestrian inputs for existing and new facilities consider commuting, recreation and other destinations for purpose of travel

3) Model Results

- Life-Cycle Costs
- Life-Cycle Benefits
- Net Present Value
- Benefit/Cost Ratio
- Rate of Return on Investment
- Payback Period
- Results calculated over lifecycle
- Person-Hours of Time Saved
- Accidents Avoided
- Emissions Reduction

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1																				
2																				
3																				
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3

District: District 99

PROJECT: Hypothetical Bike Lane Project

EA:

PPND:

INVESTMENT ANALYSIS

SUMMARY RESULTS

Life-Cycle Costs (mil. \$)	\$4.5
Life-Cycle Benefits (mil. \$)	\$5.3
Net Present Value (mil. \$)	\$0.8
Benefit / Cost Ratio:	1.2
Rate of Return on Investment:	5.6%
Payback Period:	13 years
NON-INFRASTRUCTURE IMPLEMENTATION COST	
Per Bike Program Impact Score	\$4
Per Ped Program Impact Score	\$4

Factors that Differentiate Benefits and Performance Measures

Safe Route to School	Yes
Intersection Improvements on SRTS	Yes
Programmatic Initiatives	Yes
Recreational Benefits	1

(enter 1 for Yes, 0 for No)

ITEMIZED BENEFITS (mil. \$)	Total Over 20 Years	Average Annual
Journey Quality	\$1.4	\$0.1
Additional Delay Savings	\$0.0	\$0.0
Additional Safety Benefits	\$1.8	\$0.1
Health Benefits	\$2.1	\$0.1
Emission Cost Savings	\$0.0	\$0.0
TOTAL BENEFITS	\$5.3	\$0.3
SRTS-SPECIFIC BENEFITS (mil. \$)		
Journey Quality	\$0.0	\$0.0
Additional Delay Savings	\$0.0	\$0.0
Additional Safety Benefits	\$0.0	\$0.0
TOTAL SRTS BENEFITS	\$0.1	\$0.0

	Tons		Value (mil. \$)	
	Total Over 20 Years	Average Annual	Total Over 20 Years	Average Annual
EMISSIONS REDUCTION				
CO Emissions Saved	0	0	\$0.0	\$0.0
CO ₂ Emissions Saved	112	6	\$0.0	\$0.0
NO _x Emissions Saved	0	0	\$0.0	\$0.0
PM ₁₀ Emissions Saved	0	0	\$0.0	\$0.0
PM _{2.5} Emissions Saved	0	0		
SO _x Emissions Saved	0	0	\$0.0	\$0.0
VOC Emissions Saved	0	0	\$0.0	\$0.0

- Model results and interpretation were presented in Module 3

Results

3

Overview of Benefit Calculations

- Benefit calculation worksheets produce detailed calculations for each input
- They are provided for model transparency, not a “Black Box”
- Benefit estimates are functions of your inputs and assumptions

Journey Quality

Journey Quality Benefits

This sheet calculates journey quality benefits for cyclists and pedestrians who travel to a destination. Recreational users are not included.

Formulas:

- Agg Annual Trips: Agg Daily Trips * Annual Days in Year, Agg Volume
- Value of Journey Quality: Value of Journey Quality * Agg Volume of Journey Quality
- Value of Journey Quality to Induced Riders: Value of Journey Quality to Induced Riders * Induced Volume

CLYCLING BENEFITS

Existing Facility

Year	AVERAGE ANNUAL VOLUME Example 1			JOURNEY QUALITY VALUE					Cost/benefit (\$/Trip)	Present Value (\$/Trip)
	Total Trips, Existing Facility (Millions)	Total Trips, Improved Facility (Millions)	Induced Trips, Improved Facility (Millions)	Existing Trips, Existing Facility (Millions)	Existing Trips, Improved Facility (Millions)	Induced Trips, Improved Facility (Millions)	Value of Journey Quality (\$/Trip)			
1	30,000	30,000	30,000	12,000	12,000	12,000	\$1.00	\$1.00	\$1.00	\$1.00
2	30,000	30,000	30,000	12,000	12,000	12,000	\$1.00	\$1.00	\$1.00	\$1.00
3	30,000	30,000	30,000	12,000	12,000	12,000	\$1.00	\$1.00	\$1.00	\$1.00
4	30,000	30,000	30,000	12,000	12,000	12,000	\$1.00	\$1.00	\$1.00	\$1.00
5	30,000	30,000	30,000	12,000	12,000	12,000	\$1.00	\$1.00	\$1.00	\$1.00
6	30,000	30,000	30,000	12,000	12,000	12,000	\$1.00	\$1.00	\$1.00	\$1.00
7	30,000	30,000	30,000	12,000	12,000	12,000	\$1.00	\$1.00	\$1.00	\$1.00
8	30,000	30,000	30,000	12,000	12,000	12,000	\$1.00	\$1.00	\$1.00	\$1.00
9	30,000	30,000	30,000	12,000	12,000	12,000	\$1.00	\$1.00	\$1.00	\$1.00
10	30,000	30,000	30,000	12,000	12,000	12,000	\$1.00	\$1.00	\$1.00	\$1.00
11	30,000	30,000	30,000	12,000	12,000	12,000	\$1.00	\$1.00	\$1.00	\$1.00
12	30,000	30,000	30,000	12,000	12,000	12,000	\$1.00	\$1.00	\$1.00	\$1.00
13	30,000	30,000	30,000	12,000	12,000	12,000	\$1.00	\$1.00	\$1.00	\$1.00
14	30,000	30,000	30,000	12,000	12,000	12,000	\$1.00	\$1.00	\$1.00	\$1.00
15	30,000	30,000	30,000	12,000	12,000	12,000	\$1.00	\$1.00	\$1.00	\$1.00
16	30,000	30,000	30,000	12,000	12,000	12,000	\$1.00	\$1.00	\$1.00	\$1.00
17	30,000	30,000	30,000	12,000	12,000	12,000	\$1.00	\$1.00	\$1.00	\$1.00
18	30,000	30,000	30,000	12,000	12,000	12,000	\$1.00	\$1.00	\$1.00	\$1.00
19	30,000	30,000	30,000	12,000	12,000	12,000	\$1.00	\$1.00	\$1.00	\$1.00
20	30,000	30,000	30,000	12,000	12,000	12,000	\$1.00	\$1.00	\$1.00	\$1.00
Total										\$750,720

Navigation: 1st Non-Inf Program Info | Model Inputs | Results | Journey Quality | Interaction Delay | Interaction Safety

Intersection Delay (Additional Delay Savings)

[illegible]

Intersection Safety (Additional Safety Benefits)

[illegible]

Health Benefits (Reduced Absenteeism & Mortality)

[illegible]

Emission Cost Savings

[illegible]

Overview of Monetized Benefit Calculations

- Analysis worksheets estimate monetized benefits from data in 1a) Project Info and 2) Model Inputs
- Benefit estimates are linked to the Final Calculations worksheet
- Life-Cycle Benefits, Life-Cycle Costs, and all other BCA metrics are linked to the Results page.

Journey Quality

Additional Delay Savings

Additional Safety Benefits

Health Benefits

Emission Cost Savings

Final Calculations

3) Results

INVESTMENT ANALYSIS SUMMARY RESULTS

		Total Over 20 Years	Average Annual
Life-Cycle Costs (mil. \$)	\$4.5		
Life-Cycle Benefits (mil. \$)	\$5.3		
Net Present Value (mil. \$)	\$0.8		
Benefit / Cost Ratio:	1.2		
Rate of Return on Investment:	5.6%		
Payback Period:	13 years		

ITEMIZED BENEFITS (mil. \$)

	Total Over 20 Years	Average Annual
Journey Quality	\$1.4	\$0.1
Additional Delay Savings	\$0.0	\$0.0
Additional Safety Benefits	\$1.8	\$0.1
Health Benefits	\$2.1	\$0.1
Emission Cost Savings	\$0.0	\$0.0
TOTAL BENEFITS	\$5.3	\$0.3

SRTS-SPECIFIC BENEFITS (mil. \$)

	Total Over 20 Years	Average Annual
Journey Quality	\$0.0	\$0.0
Additional Delay Savings	\$0.0	\$0.0
Additional Safety Benefits	\$0.0	\$0.0
TOTAL SRTS BENEFITS	\$0.1	\$0.0

Factors that Differentiate Benefits and Performance Measures

	Yes	No
Safe Route to School	Yes	
Intersection Improvements on SRTS	Yes	
Programmatic Initiatives	Yes	
Recreational Benefits	Yes	

(enter 1 for Yes, 0 for No)

EMISSIONS REDUCTION

	Total Over 20 Years	Average Annual	Total Over 20 Years	Average Annual
CO Emissions Saved	0	0	\$0.0	\$0.0
CO ₂ Emissions Saved	112	6	\$0.0	\$0.0
NO _x Emissions Saved	0	0	\$0.0	\$0.0
PM ₁₀ Emissions Saved	0	0	\$0.0	\$0.0
PM _{2.5} Emissions Saved	0	0		
SO _x Emissions Saved	0	0	\$0.0	\$0.0
VOC Emissions Saved	0	0	\$0.0	\$0.0

Cal-B/C AT – Adapting to Treasure Valley

Adjust CA Specific Parameters

Auto Accident Costs – Safety Benefits

Statewide Highway Crash Rates		
Fatal Crash	0.005	per mil veh-mi
Injury Crash	0.28	per mil veh-mi
PDO Crash	0.61	per mil veh-mi
Non-Freeway	1.04	per mil veh-mi

Sources: 1) Office of Management and Budget (OMB), 2) Review of OMB and State Treasurer's Office data, 3) Bureau of Labor Statistics (BLS) OES 2020, 4) BLS Employment Cost Index, 5) USDOT Department Guidance 2021, 6) California Department of Transportation TSI and Traffic Operations, 7) IDAS model, 8) AAA Daily Fuel Gauge Report 2021, 9) California Board of Equalization, 10) Caltrans Transportation Funding in California 2020, 11) AAA Your Driving Costs 2021, 12) American Transportation Research Institute 2021, 13) USDOT VSL, 14) NHTSA 2010, 15) Crash Data on California State Highways 2018

Source: Crash Data on CA Highways 2018

Adjust Other Parameters

- Mode-shifts Rates – Vehicles to Cycling / Pedestrian
- Crash reduction factors – Specific measures

Emissions Rates – Emissions Benefits

HIGHWAY EMISSIONS FACTORS (g/mi)								
Model Year 2024								
Mode	Speed	CO	CO2	NOX	PM10	SOX	VOC	PM2.5
Auto	0	3.5182	78.9185	0.3056	0.0022	0.0008	0.3900	0.0020
	5	1.3616	555.4365	0.0959	0.0070	0.0055	0.0868	0.0065
	6	1.3409	538.7039	0.0933	0.0065	0.0053	0.0797	0.0060
	7	1.3206	522.4754	0.0907	0.0060	0.0052	0.0732	0.0055
	8	1.3005	506.7358	0.0881	0.0055	0.0050	0.0672	0.0051
	9	1.2807	491.4703	0.0857	0.0051	0.0049	0.0617	0.0047
	10	1.2613	476.6647	0.0833	0.0047	0.0047	0.0567	0.0043
	11	1.2223	452.5800	0.0804	0.0043	0.0045	0.0518	0.0039
	12	1.1846	429.7124	0.0775	0.0039	0.0042	0.0473	0.0036
	13	1.1480	408.0001	0.0748	0.0036	0.0040	0.0433	0.0033
	14	1.1126	387.3849	0.0721	0.0033	0.0038	0.0396	0.0030
	15	1.0783	367.8114	0.0696	0.0030	0.0036	0.0361	0.0027
	16	1.0942	366.7610	0.0702	0.0029	0.0036	0.0348	0.0026
	17	1.1103	365.7136	0.0708	0.0028	0.0036	0.0335	0.0025
	18	1.1267	364.6693	0.0714	0.0027	0.0036	0.0323	0.0024
	19	1.1433	363.6278	0.0720	0.0026	0.0036	0.0311	0.0024
	20	1.1601	362.5894	0.0726	0.0025	0.0036	0.0300	0.0023

Source: CA Air Resources Board, EMFAC 2021

Mortality Risk – Health Benefits

AGE COHORTS FOR MORTALITY RISK REDUCTION (percent of population)				
Mode	Age Cohort	Urban		Rural
		South	North	
Cycling	Age 16-64	54.9%	54.9%	44.6%
Walking	Age 16-74	80.5%	80.5%	79.9%

AVERAGE DISTANCE PER ACTIVE TRANSPORTATION TRIP (miles/trip)				
Mode	Age Cohort	Urban		Rural
		South	North	
Cycling	Adults	2.29	2.29	7.89
	Children <16	0.99	0.99	0.78
Walking	Adults	0.68	0.68	0.60
	Children <16	0.63	0.63	1.08

TRIP PURPOSE FOR ACTIVE TRANSPORTATION TRIPS (percent of trips)				
Mode	Trip Purpose	Urban		Rural
		South	North	
Cycling	Commuting	18.6%	18.6%	9.9%
	Recreation	46.1%	46.1%	62.2%
	Other Destination	35.3%	35.3%	27.9%
Walking	Commuting	5.2%	5.2%	6.2%
	Recreation	55.0%	55.0%	63.5%
	Other Destination	39.8%	39.8%	30.3%

Source: 2017 NHTS, California Sample

Group Questions

■ Analyses

- What data are needed to perform analyses?
- What are examples of data sources?
- How would results be best communicated?
- Who should be the target audience?



Thank you!

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