Measuring Success:

Using data wisely for a healthier, wealthier, more equitable city

Old Speed Paradigm -> Roadway LOS

Level of Service (LOS)	Unsignalized Intersection Control Delay (sec/veh)	Signalized Intersection Control Delay (sec/veh)
A	≤ 10	≤10
B	> 10 - ≤ 15	> 10 - ≤20
C	> 15 - ≤25	> 20 - ≤35
D	> 25 - ≤35	> 35 - ≤55
E	> 35 - ≤50	> 55- ≤ 80
F	> 50	> 80

Source: 2000 HCM

Arterial Class	I	II	III
Level of service	Average Travel Speed (MPH)		
A	≥ 35	≥ 30	≥ 25
B	≥ 28	≥ 24	≥ 19
C	≥ 22	≥ 18	≥ 13
D	≥ 17	≥ 14	≥ 9
E	≥ 13	≥ 10	≥ 7
F	< 13	< 10	< 7

Level of Service A

Level of Service F

Source: Neighborhoods.org

Level of Service F

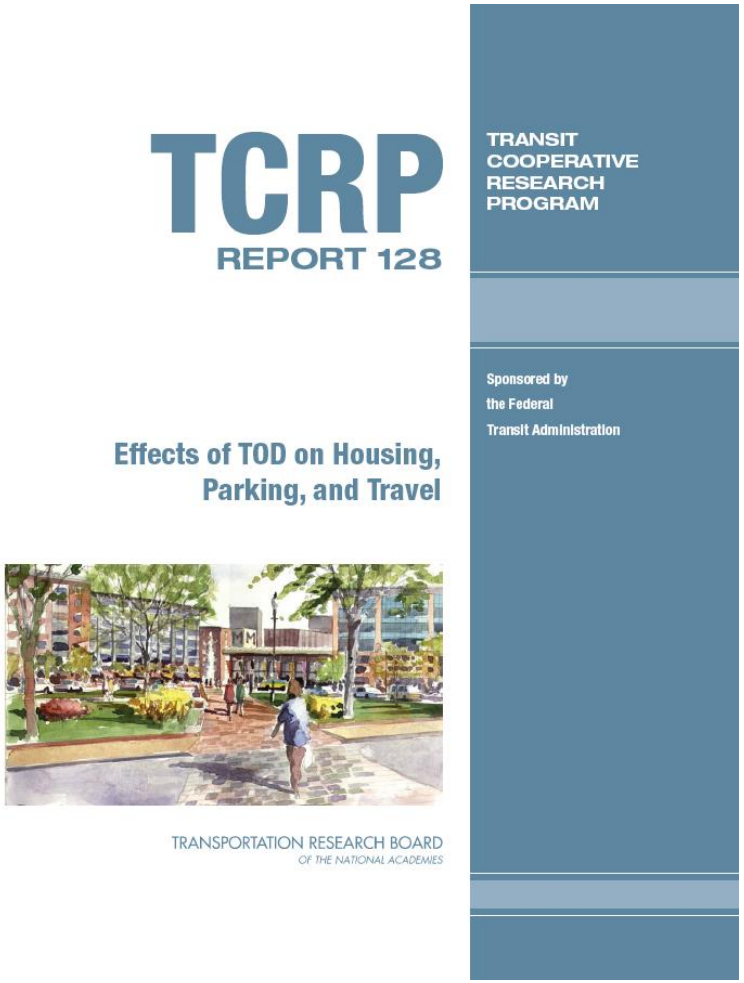
Source: Downtown San Jose Blog

What's important depends upon perspective

Traffic engineer:	F	A
Economist:	A	F

What's wrong with LOS?

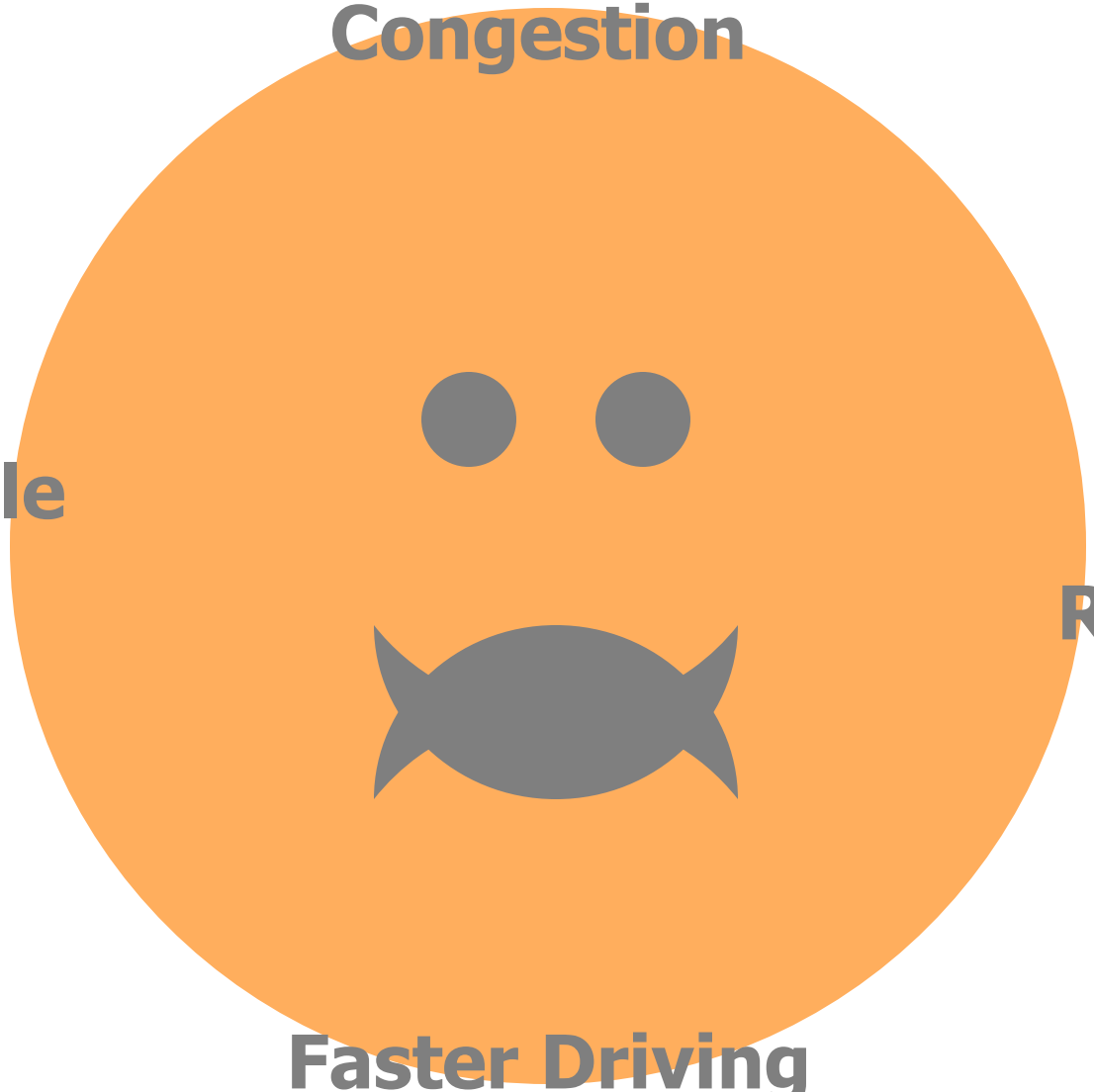
- To be "conservative," transportation analyses typically use ITE trip generation rates, data from isolated, single-use projects with no access except by car.
- TODs typically generate ~50% fewer vehicle trips than predicted by ITE. ("Effects of TOD on Parking, Housing and Travel," TCRP 128, 2008)
- Guidelines focus on localized traffic impacts and ignores regional impacts.



LOS *Increases* Congestion

- To mitigate a negative transportation impact:
  - Reduce density
  - Widen roadways
  - Transportation Demand Management
  - Move the project to a more isolated location with less existing traffic congestion
- Result: Less walking, biking and transit. Mitigation becomes a self-fulfilling prophesy

Induced and Latent Demand



What Get Measured Get Done

How do we use Performance Measures?

- Improving efficiency of system operations
- Managing a given road or corridor
- Prioritizing funding
- Measuring impact of new development
- Imposing development fees
- Reporting to Congestion Management Agency
- Reporting on achievement of various goals

What is transportation for?

- Transportation is not an end in itself
- It is merely a means by which we support individual and collective goals and objectives

Measure what matters

Why not Consider…

- Economic Development
  - Job creation
  - Real estate value increase
  - Retail sales
- Quality of Life
  - Access to jobs
  - Access to shopping
  - Residential property value impact
- Social Justice
  - Do benefits accrue equitably?
  - Are investments spread equitably?
- Ecological Sustainability
  - VMT per capita (=CO_2, NO_x, runoff, etc.)
  - Land use/transportation connection

Multiple Account Evaluation (MAE)

- Adopted from United Kingdom
- New Approach To Transport Appraisal (NATA)
- Multiple “benefit accounts” considered
- Criteria selected based on local conditions/values

Applying the MAE

- Organized into three “accounts” that correspond to the outcomes-based RTP evaluation approach:

25 Evaluation Criteria

Community	Environment	Economy	Deliverability
C1: Supportiveness of Existing Land Uses C2: Local Aspirations C3: Placemaking and Urban Form C4: Ridership Generators C5: Support of regional 2040 Growth Concept C6: Integration with Regional Transit System (*Addressed in White Paper)* C7: Integration with Other Road Uses C8: Congestion Avoidance Benefit C9: Equity Benefit C10: Health (Promotion of Physical Activity) C11: Safety and Security *(Addressed in White Paper)* C12: Housing + Transportation Affordability Benefit C13: Transportation Efficiency (User Travel Time Savings)	EN1: Reduction in Emissions and Disturbance EN2: Risk of Natural Resource Disturbance EN3: Risk of 4(f) Resource Disturbance *(Addressed in White Paper)*	EC1: Transportation Efficiency (Operator – cost per rider) EC2: Transportation Efficiency (System annualized capital & operating cost per rider) EC3: Economic Competitiveness (Change in employment served) EC4: Rebuilding/ Redevelopment Opportunity (vacant and redevelopable land)	D1: Total Project Capital Cost (Exclusive & Non-Exclusive ROW Options) D2: Capital Cost Per Mile (Exclusive & Non-Exclusive ROW Options) D3: Operating & Maintenance Cost D4: Total Corridor Ridership D5: Funding Potential

MAE Matrix

Corridor	Description	Community	C1. Supportiveness of Existing Local Land Use	C2. Local Aspirations	C3. Placemaking and Urban Form	C4. Ridership Generators	C5. Region 2040 Connections	C6. Integration with Regional Transit System	C8. Congestion Avoidance	C9. Equity Benefit	C10. Health (Promote Physical Activity)	C12. Housing + Transportation Affordability Benefit	C13. Transportation Efficiency (Users travel time savings)	Environment	EN1. Emissions & Disturbance	EN2. Natural Resources	Economy	EC1. Transportation Efficiency (Operator - cost/rider)	EC2. Transportation Efficiency (System ann. Cap and op cost/rider)	EC3. Economic Competitiveness - change in employment	EC4. Rebuilding Potential - vacant and redevelopable land	Deliverability	D1. Capital Cost - Feasibility of Construction (Exclusive ROW)	D2. Capital cost per mile (Exclusive ROW)	D3. Operating and Maintenance Costs (HCT line)	D4. Total corridor ridership
8	Clackamas Town Center to Oregon City via I-205 (LRT)		1	2	0	0	3	2	1	0	1	1	1		1	-1		0	-1	0	1		0	-1	-1	1
9	Park Ave to OCTC via McLoughlin (LRT extension)		0	2	2	0	3	3	1	0	1	1	1		0	-1		0	-1	0	0		0	-2	-1	1
10	Portland to Gresham via Powell (LRT)		3	3	3	3	3	3	2	2	2	3	0		1	-2		-1	-1	3	1		-1	-2	-3	2
11	Portland to Sherwood via Barbur/Hwy 99 (LRT)		3	3	2	3	2	3	2	2	2	2	2		2	-3		0	-1	3	2		-2	-2	-2	3
12	Hillsboro to Forest Grove (LRT extension)		0	2	0	3	2	1	0	2	1	1	2		1	-1		-2	-2	0	2		0	-1	-1	0
13	Gresham to Troutdale Extension (LRT Extension)		0	2	-1	2	2	1	0	0	2	1	1		0	-1		0	-1	0	0		0	-2	0	0
13D	Troutdale to Damascus (LRT)		0	2	-3	2	2	1	1	0	1	0	1		3	-3		-2	-3	1	3		-3	-2	-2	1
16	Clackamas Town Center to Damascus via Sunnyside (LRT)		0	2	-2	1	2	1	0	0	0	0	1		0	0		-2	-3	0	2		0	-2	-1	0
17	Sunset Transit Center to Hillsboro via Hwy 26 / Evergreen		2	3	-1	2	2	1	2	2	2	1	0		2	-2		-1	-1	3	2		-1	-1	-2	2
17D	Tanasborne (LRT extension)		1	3	-2	1	2	1	0	0	1	0	0		1	-1		0	-1	1	1		0	-1	0	0
28	Clackamas Town Center to Washington Square via I-205/217 (LRT)		1	2	-1	1	3	1	3	1	1	2	2		3	-3		-2	-2	3	3		-3	-1	-3	2
29	Clackamas Town Center to Washington Square via RR ROW (LRT)		3	2	-1	2	3	2	3	1	1	2	3		3	-3		-2	-2	3	1		-2	-1	-3	2
32	Beaverton to Hillsboro via TV Highway (LRT)		2	2	1	2	3	1	1	2	3	2	1		1	-2		-1	-2	2	1		-1	-2	-1	1
34	Beaverton to Wilsonville (LRT upgrade)		3	2	-2	1	3	2	3	2	3	2	1		3	-3		0	-1	3	2		-2	-1	-2	3
38S	Sherwood to Tualatin		1	1	-2	0	1	1	1	0	1	0	0		0	-2		-1	-1	0	2		0	-1	0	0
43	Downtown Portland to Yellow Line via St. Johns (LRT)		3	2	2	2	2	1	0	2	1	2	0		0	-3		-3	-3	2	0		0	-2	-2	0
54	Troutdale to St. Johns via US 50 (LRT)		0	2	1	2	1	1	0	3	2	2	3		1	-3		-3	-3	2	2		-2	-2	-3	0

Case Study: Santa Monica

Process

- Identify local values
- Identify long list of performance measures
- Refine into short list:
  - Assess today's conditions
  - Predict future conditions
  - Evaluate projects
  - Conduct EIRs
- Create tools and gather data
- Establish targets and thresholds
- Report back to public and Council
- Adopt impact fee

Start with Transportation Principles

- Measure Success
- Management
- Streets
- Quality
- Public Space
- Environment

- **Health**
- **Affordability**
- **Economy**
- **Equity**
- **Safety**
- **Public Benefits**

Creating a Shortlist

- For each principle, a long list of potential measures – and tools for measuring
- Next step: Short list:
  - Shortest list of measures that captures Santa Monica values
  - Minimize data collection costs
  - Maximize clarity
- Some measures, like per capita Vehicle Miles Traveled, capture many values: Greenhouse gases, congestion, air quality, etc.

The Long List

Measure	Cost/Time Consumption	Implementation	EIR	Project Review	Corridor Review	Report Card	Travel Model
MANAGEMENT							
•Relative travel times by mode	Medium	Can be modeled; see WeHo traffic model. Can also be collected through data collection. Transit travel times can be automated in GPS.	√	√	√	√	√
•Person capacity – walking, bike, transit, auto, parking, bike parking	Medium - Heavy	This is a GIS/Excel type function that can be included if there is survey data available. Can be modeled. This needs to be further defined.	√?		√		√?
•Transit LOS: productivity, farebox return, delay, reliability	Medium - Heavy	This will take extensive model development if we want to get to this level in the demand model. Direct ridership modeling would be another option and would require less data/development time. Transit LOS could also be developed and monitored separate from the model in an Excel spreadsheet. BBB already does a basic collection of this info, and full transit LOS data may be available in upcoming GPS reporting from BBB. Seattle uses transit LOS in an annual GIS report card map, focusing on transit speed and frequency. SF uses transit LOS in their EIRs	√	√	√	√	√
•Neighborhood spill-over	Medium	Either traffic volumes or driver behavior (speed, etc)	√			√	
Congestion	Light	The sustainability report card currently measures intersection LOS. Congestion is also indirectly measured in the relative travel times by mode and the person capacity analysis above. (There is community resistance to using intersection LOS.) Adjust significance thresholds if used for EIRs.	√	√	√	√	√

Vary targets by Context

Street Network

City of Santa Monica
Land Use and Circulation Element

- **Boulevard** — Regional transportation corridor with continuous mixed use and commercial land uses. Provides access for all forms of transportation, but emphasizes transit and walking. Regional auto traffic is accommodated here in order to minimize regional traffic on parallel streets.
- **Special Streets** — Unique and ceremonial streets requiring special consideration, such as the Third Street Promenade
- **Commercial: Downtown** — Provides access for all transportation and supporting downtown.
- **Commercial: Neighborhood** — Provides access for all transportation and supporting neighborhood retail.
- **Avenue: Major** — Serves regional automobile trips and provides access for all modes of transportation. Designed to discourage regional auto traffic from using Secondary or Minor Avenues.
- **Avenue: Secondary** — Distributes auto trips onto Minor Avenues and Neighborhood Streets, often serving regional bicycle trips by providing signalized crossings at Boulevards and Major Avenues.
- **Avenue: Minor** — Serves local auto and bicycle trips.
- **Avenue: Industrial** — Minor street serving industrial area.
- **Neighborhood Street** — Provides access primarily to abutting uses. Autos travel slowly enough to stop for people in the street.
- **Shared Street** — Serves as areas where autos travel slowly enough to mix safely with people walking or bicycling, may not be wide enough to accommodate separate zones for people walking, bicycling, parking or driving.
- **Parkway** — Serves as linear park incorporating continuous landscaping, recreational bikeways and pedestrian paths.
- **Pathways** — Pedestrian-only streets
- **Bikeway - Lane/Path/Bicycle Boulevard** — Bicycle lanes, bicycle paths and streets designed so that cars and bicycles can mix comfortably.
- **Transit Investment** — Planning underway for rail service, including subway and light rail with regional connections.
- **Highway** — Serves regional and interstate auto traffic.
- **Alley** — Provide local property access.
- **Light Rail Stop**
- **Major Bus Stop**

Updated 10-30-2009

0 0.25 0.5 MILES

Santa Monica: Application

- Main Street

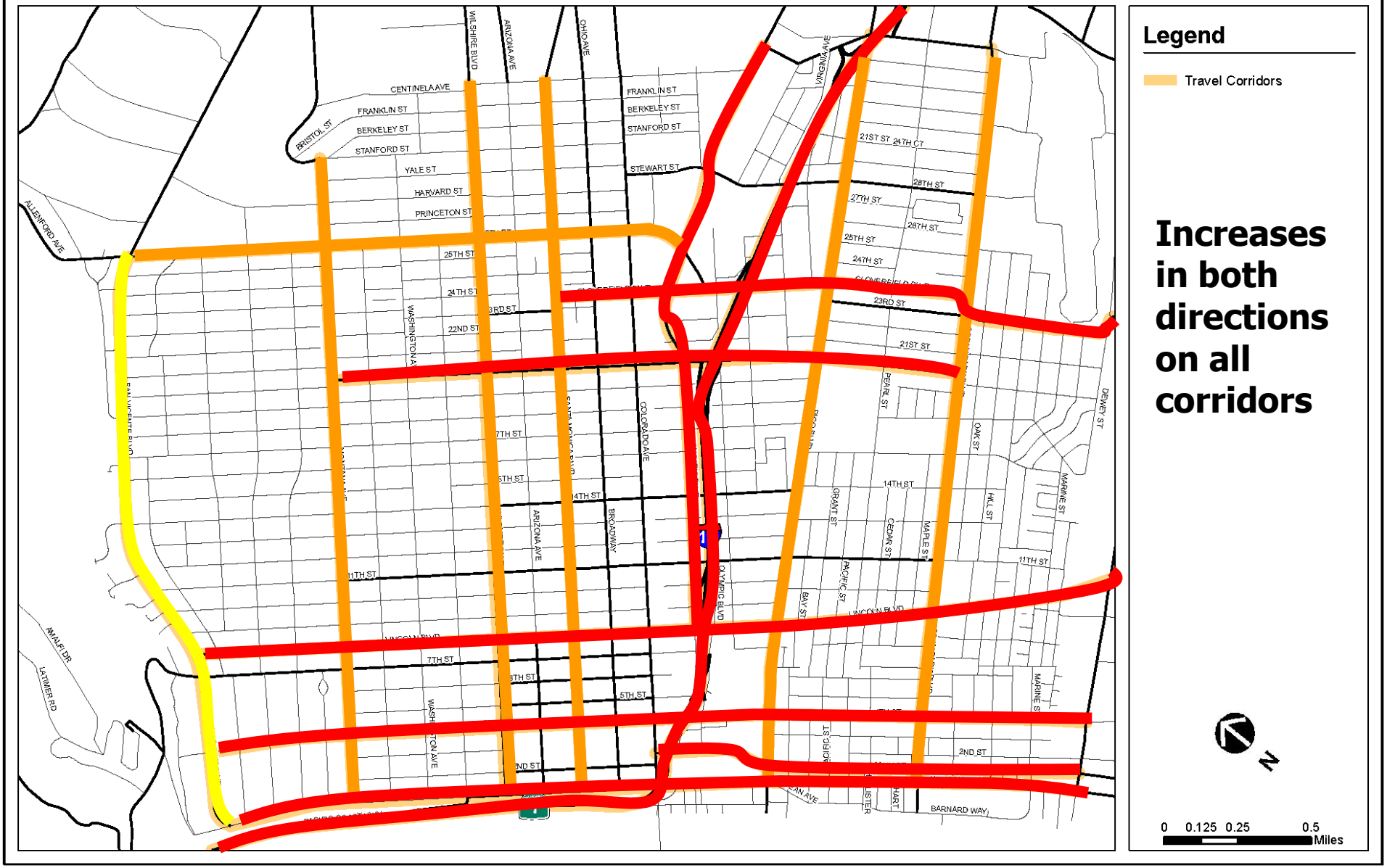
FUNCTION	CONTEXT ZONE	Minimum	Desirable	Preferred	Measured
Transit					
Secondary	N'hood Commercial	≥-1	≥-0.5	≥+1	-0.8
Auto					
Secondary	N'hood Commercial	<1.2	<0.8	>0.6	0.75
Pedestrian					
Primary	N'hood Commercial	B	A	A	B

- Result: OK to slightly degrade auto QOS to improve transit and pedestrian QOS. Signal prioritization OK, but not dedicated transit lane.
- Goal: Bring all measures into *balance*

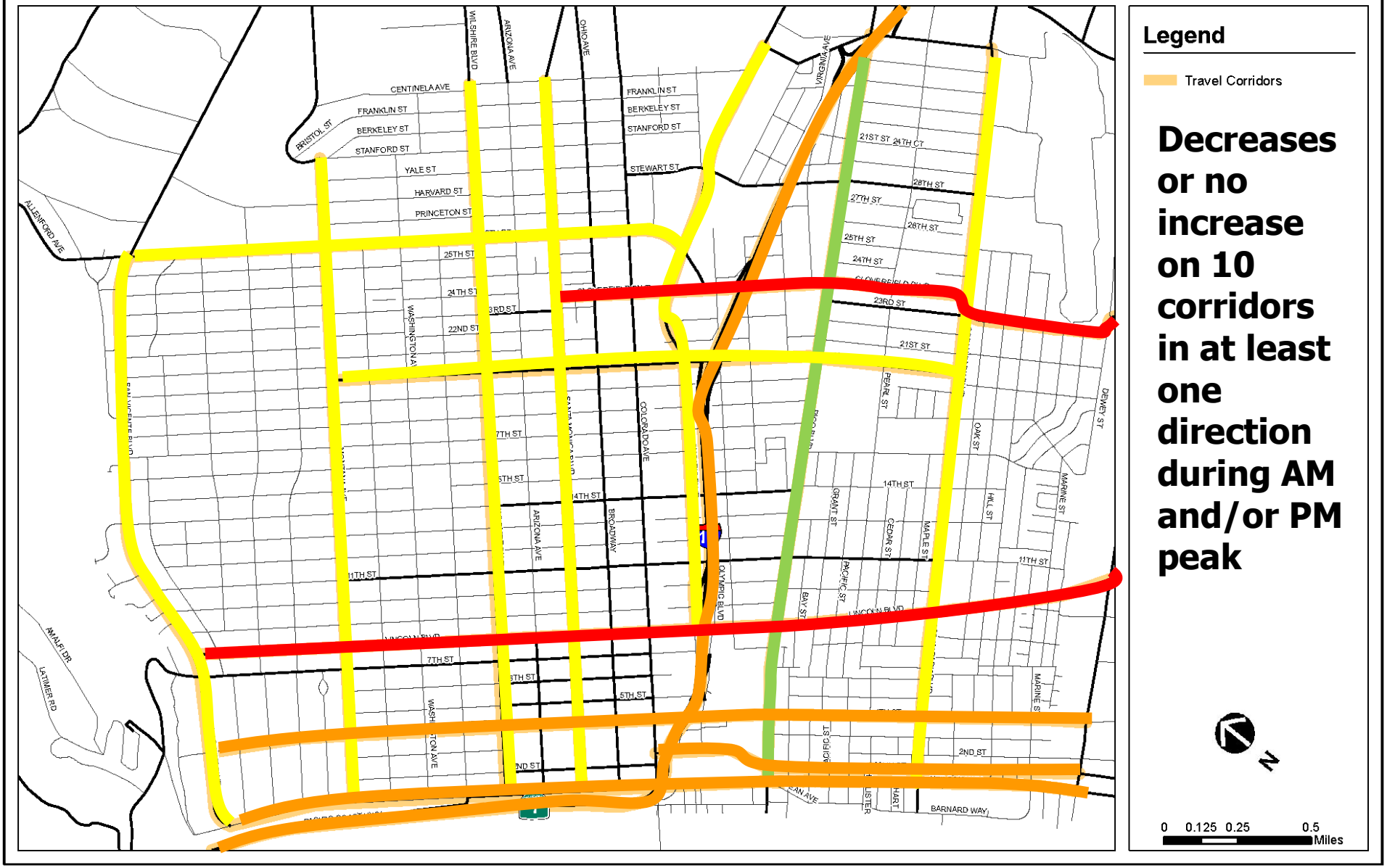
Tools and Data

- GIS mapping
- Transportation Demand Management reporting data
- Big Blue Bus GPS data
- Public perception surveys
- Traffic counts

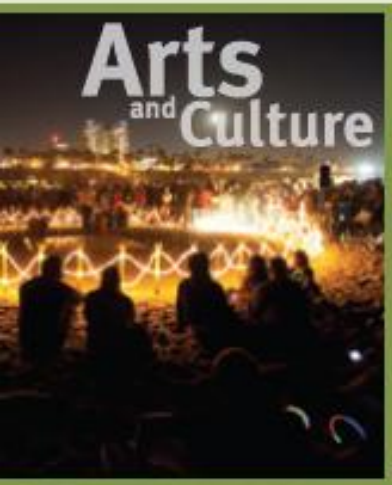
Results: Delay from Previous Tools

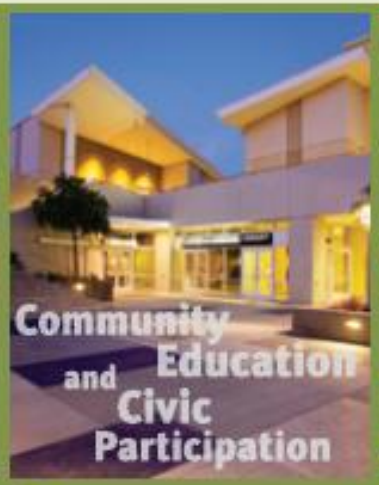


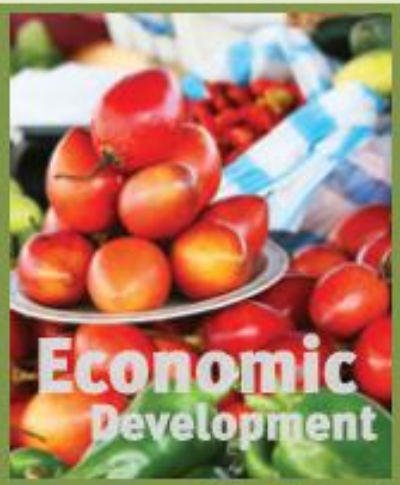
Reduced delay from new approach

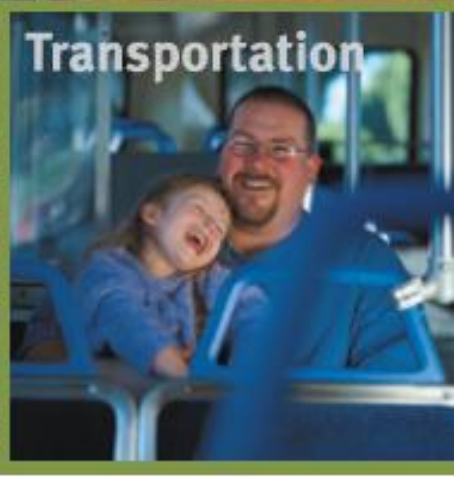


Sustainable Santa Monica







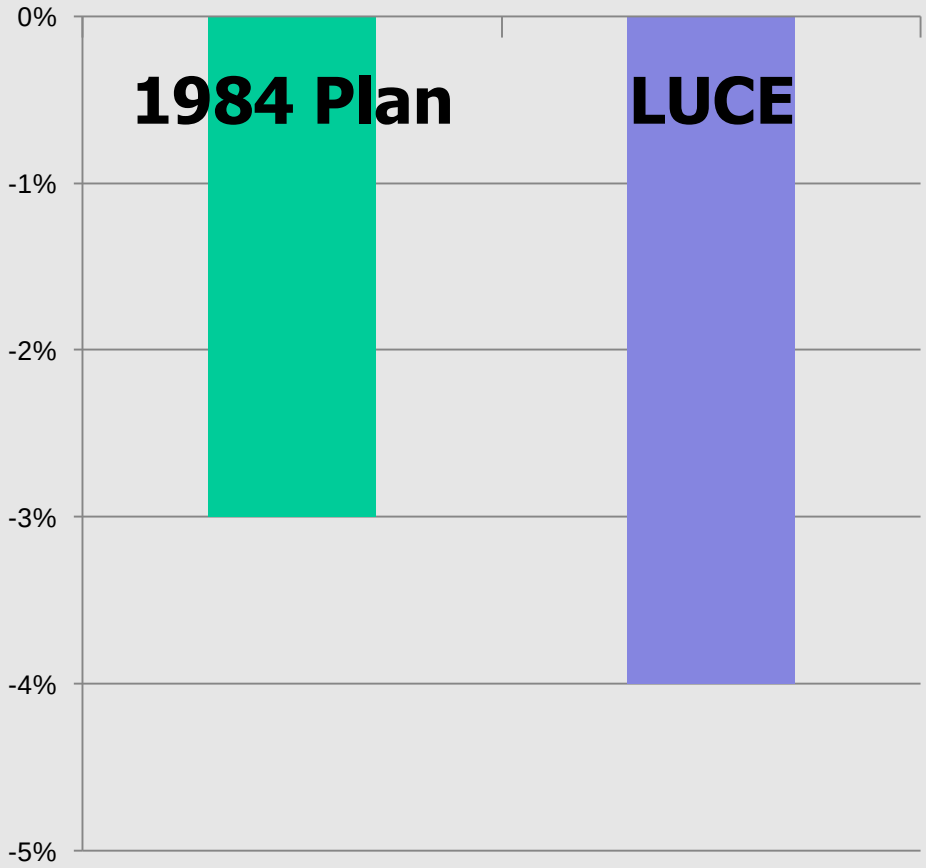


2012 Sustainable City Report Card

The Sustainable City Plan was created to enhance our resources, prevent harm to the natural environment and human health, and benefit the social and economic well-being of the community for the sake of current and future generations.

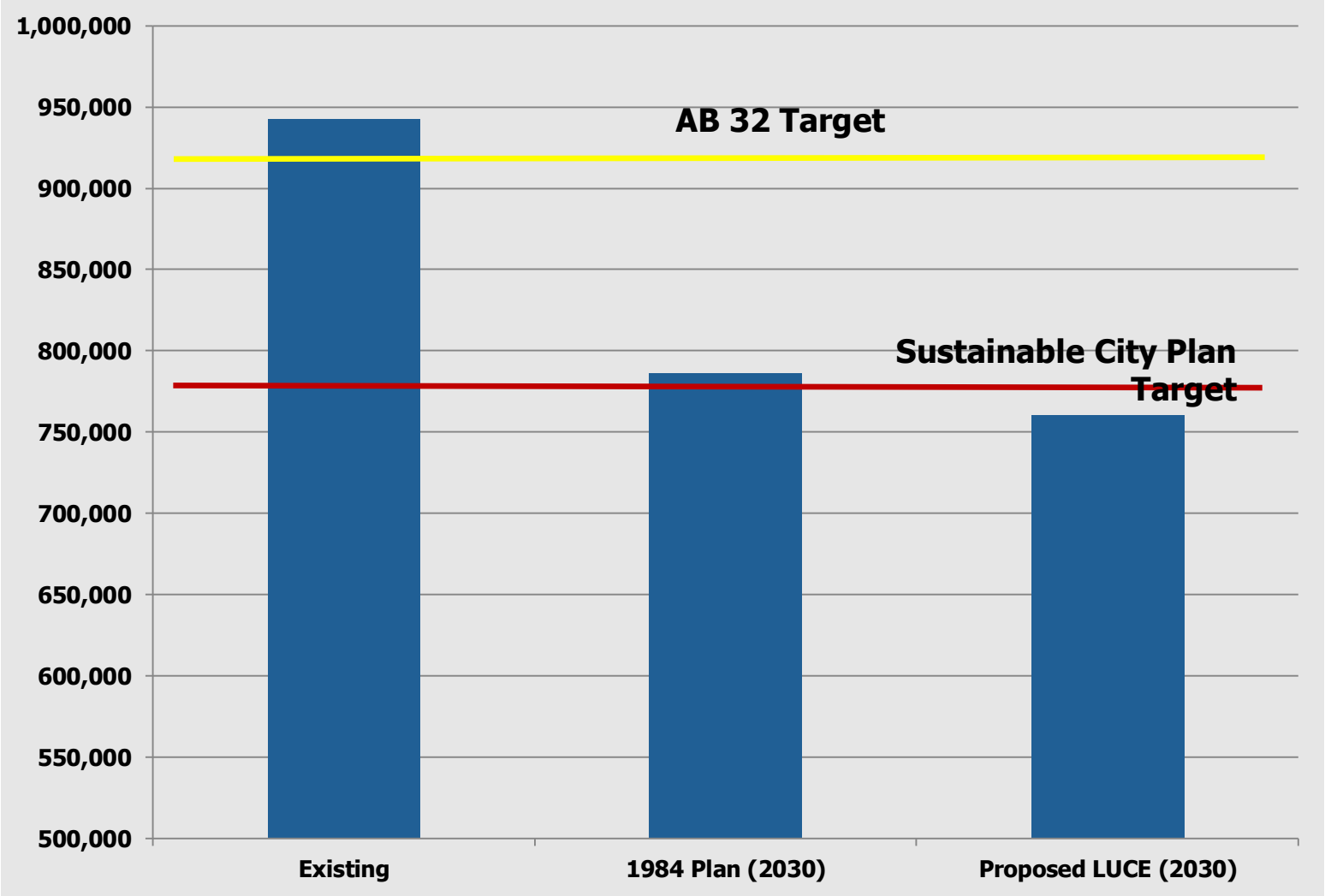
Achieves major outcome goals: Reduce VMT

- 4% decrease in per capita Vehicle Miles Traveled for proposed LUCE
- 33% improvement in per capita VMT reduction compared to 1984 Plan.



"Per capita" includes population and employment

Results: Achieves GHG Reduction Goals



Best practice

- Focus on outcomes.
- Ensure your local values are reflected and quantified. Include the triple bottom line.
- Use available or easily collectable data.
- Focus on citywide or regional impacts: don’t make things a lot worse for everyone in order to make things a little better for a few.
- MMLOS can be bad for transit, biking and walking if misapplied.
- Focus on quality, not crowding.
- For congestion, focus on per capita Vehicle Miles Traveled.