Photo: SFMTA

Defining and Measuring Success:
Lessons from LOS Reform

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Got Congestion?

Dallas Morning News http://www.dallasnews.com/news/transportation/20121125-plan-ahead-then-navigate-lbj-freeway-construction.ece

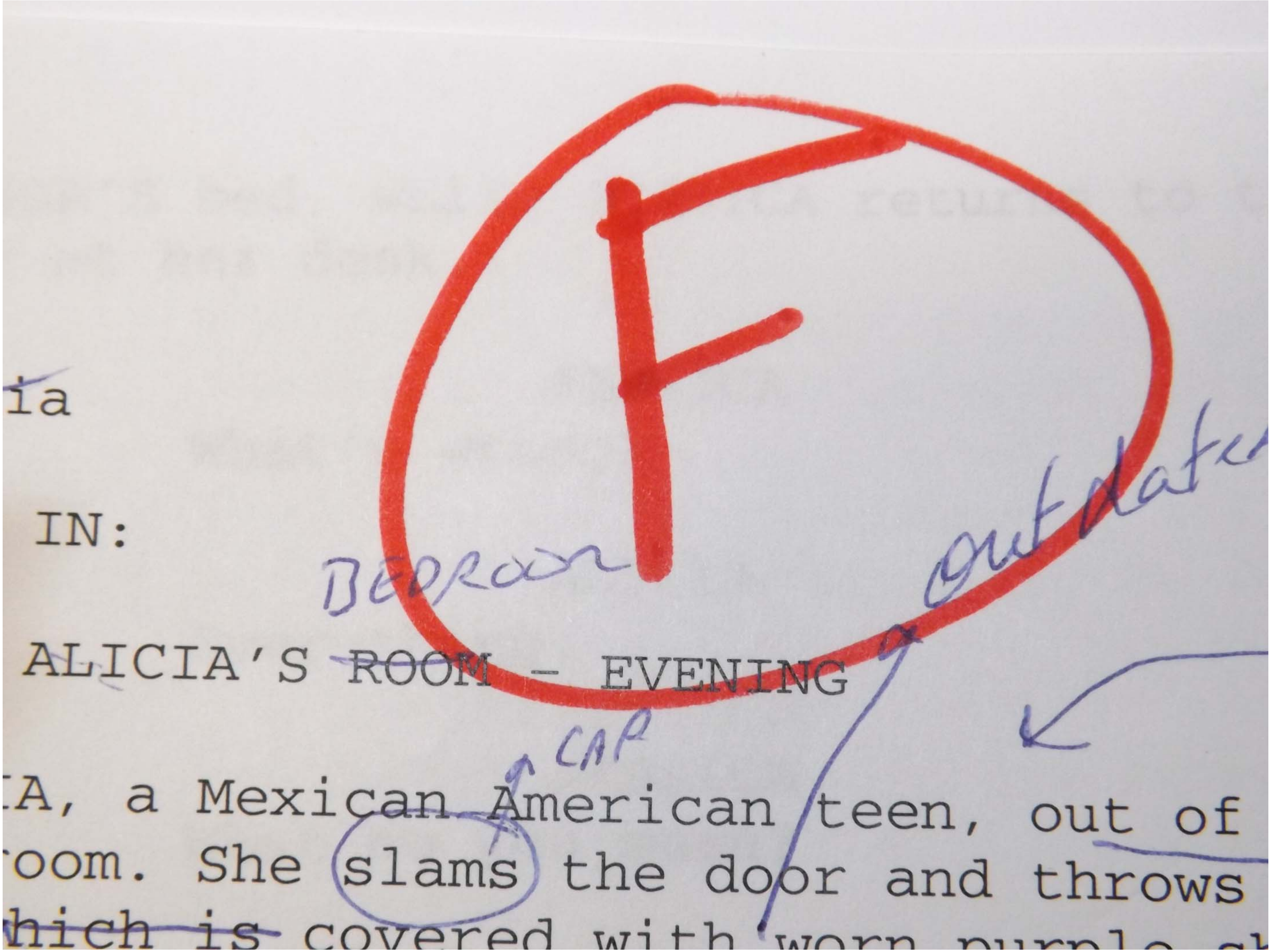

Want Growth?


Acknowledge your current approach is failing

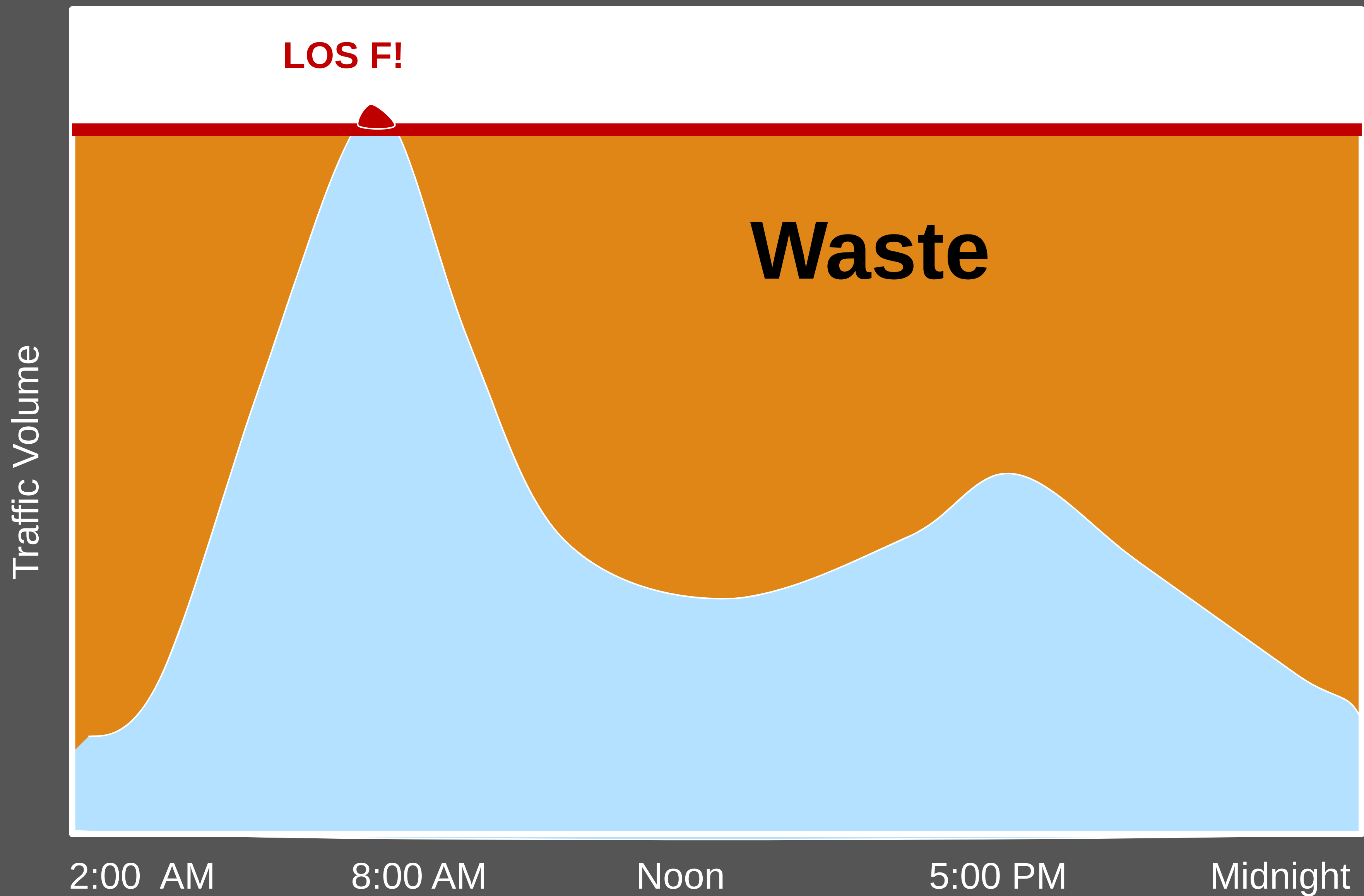
Old Speed Paradigm → Roadway LOS

LOS	Average delay in seconds per vehicle	Description of motorist perception
A	< 10	Free-flow traffic: "Good" LOS
B	10.1 – 20	Reasonable free-flow
C	20.1 – 35	Stable but unreasonable delay begins to occur
D	35.1 – 55	Borderline "bad" LOS
E	55.1 – 80	"Bad" LOS: long queues
F	> 80	Unacceptable: very high delay, congestion

Source: Reid Ewing


F
ia
IN:
BEDROOM
ALICIA'S ROOM - EVENING
CAP
A, a Mexican American teen, out of
oom. She slams the door and throws

Traffic Economics



Level of Service A

Level of Service F

Source: Neighborhoods.org

What's important depends upon perspective

Traffic engineer:	**F**	**A**
Economist:	**A**	**F**

Problem 1: Last One In

A → D

D → E

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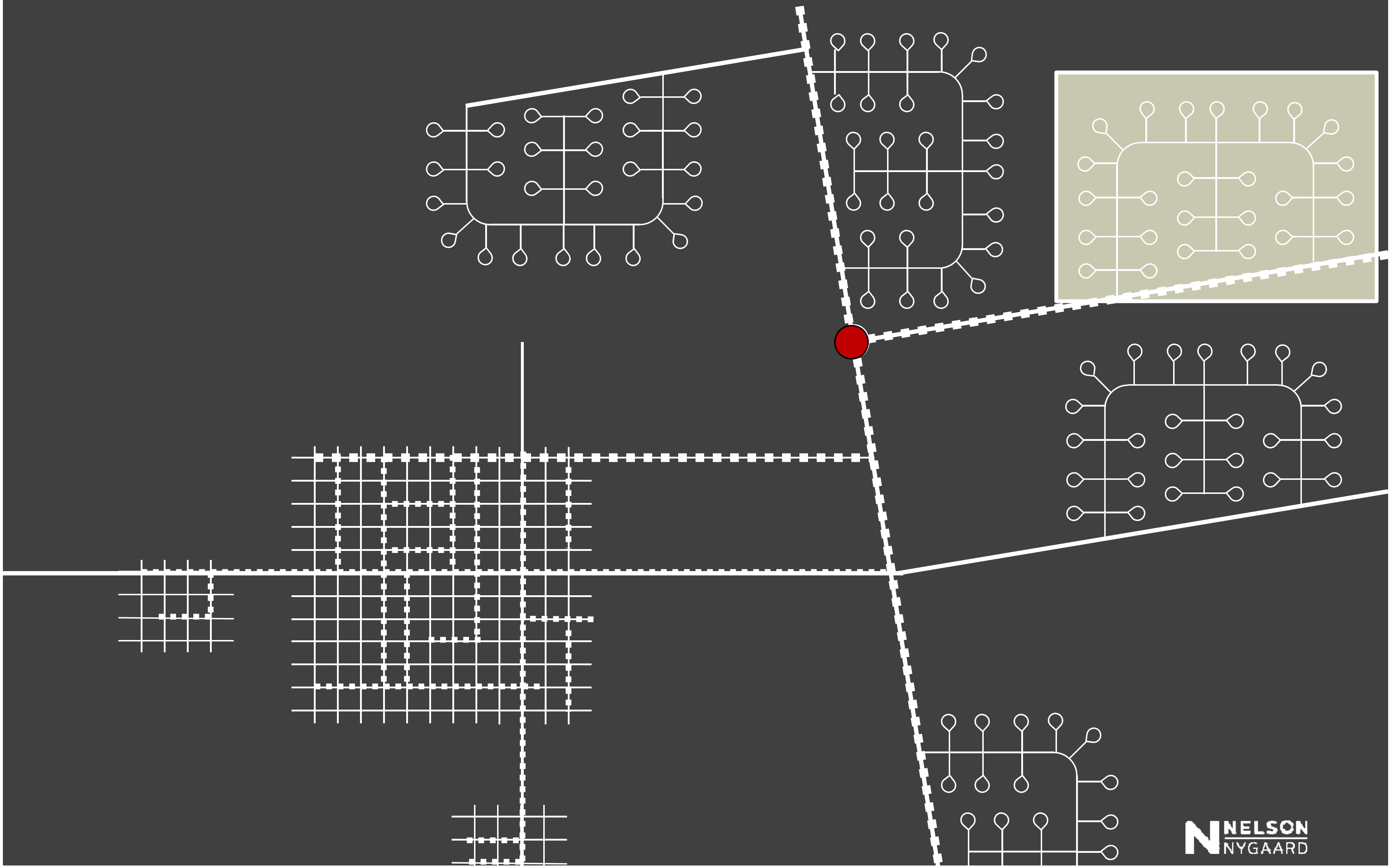
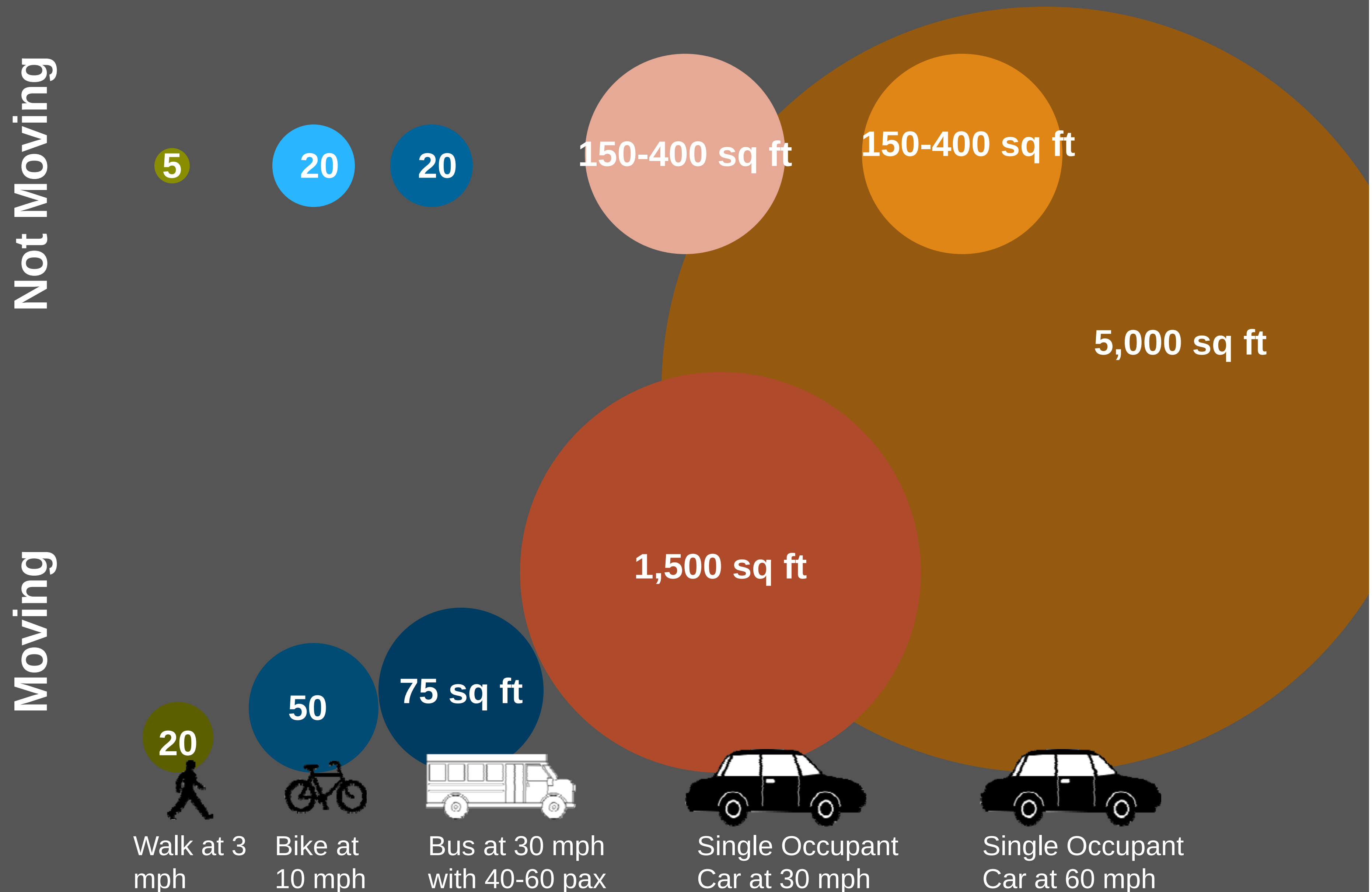
Problem 2: Analysis Scale too small



Problem 3: Vehicle Delay, Not Person Delay



Adapted from infographic by Matthew Blackett/Spacing.ca with data from Victoria Transport Policy Institute

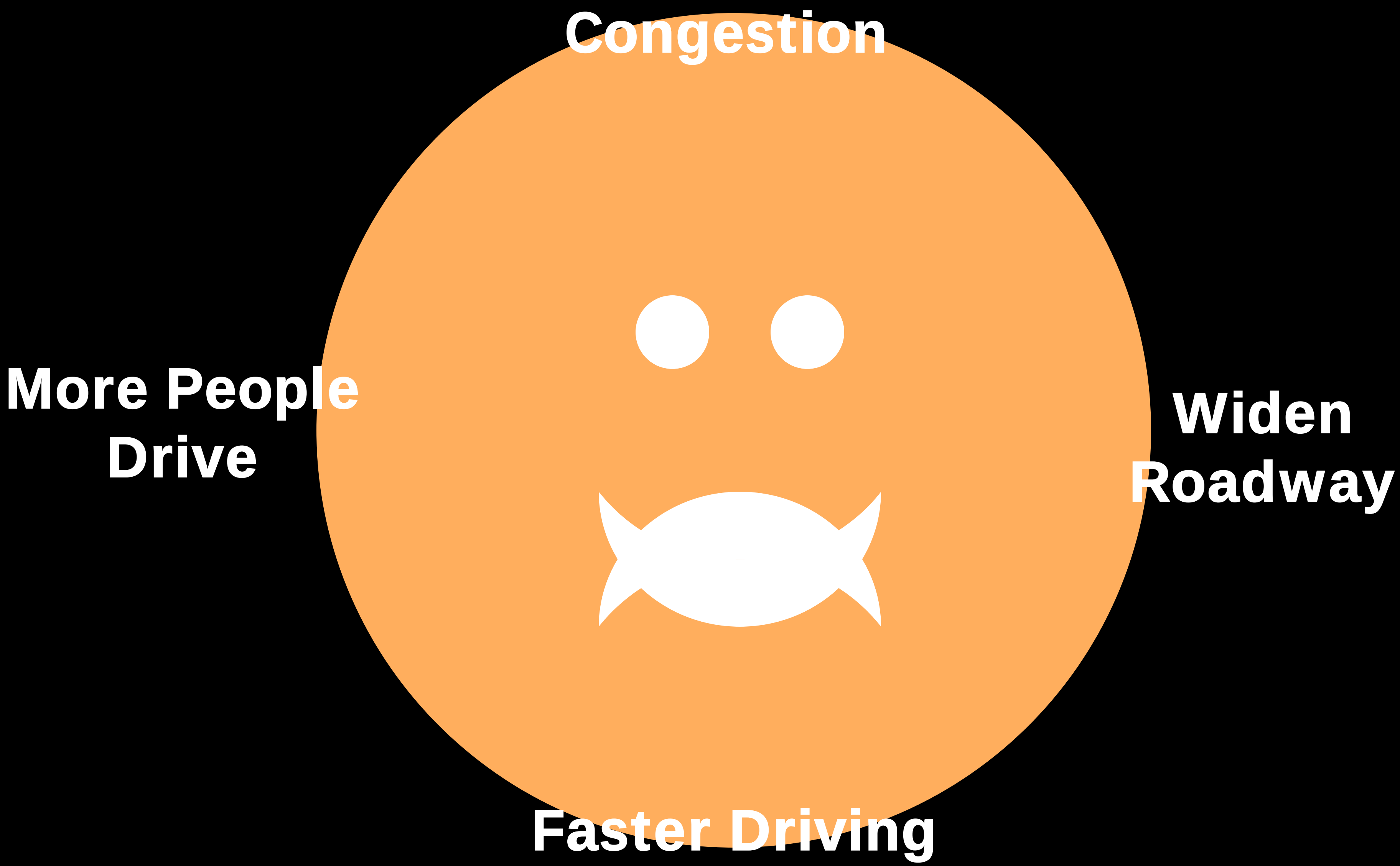
Problem 4: Other Modes are the Problem

Problem 5: Mitigations – Shrink the Project?

Problem 6: Mitigations – Move the Project?

Problem 7: Mitigations – Widen the Road

Induced and Latent Demand



Overreliance on LOS is Creating the Problems It was intended to solve

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

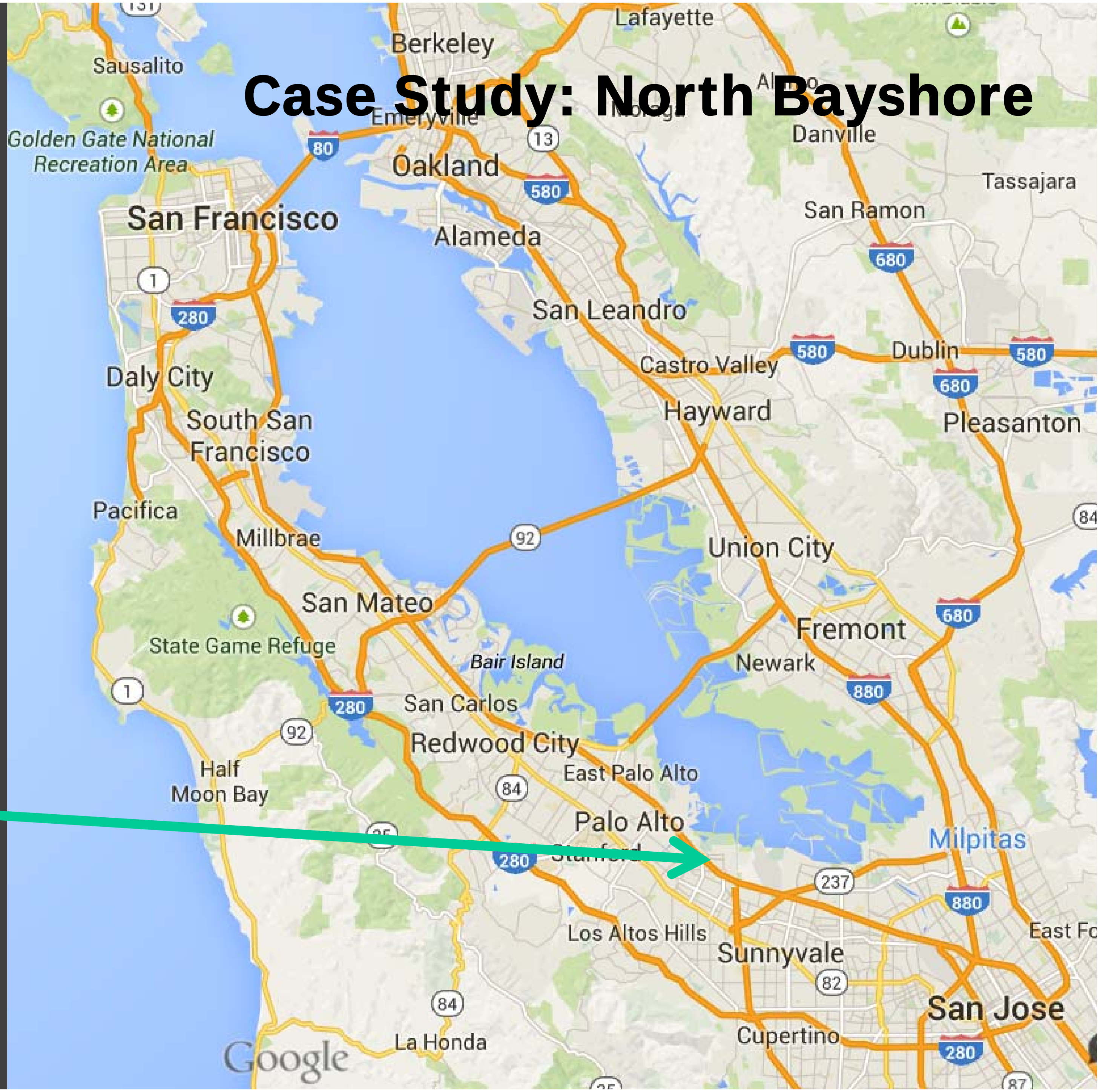
Why not Consider…

- 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

Case Study: Mountain View CA

Case Study: North Bayshore

Mountain View



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1. Parking is your primary traffic management tool
2. Stop using FAR and density control as traffic management proxy.
3. Use parking to create business case for TDM.
4. Share.
5. Future-proof.

Mode Share Targets

Goal: Achieve the mode share targets established in the Shoreline Transportation Study

Travel Mode	2030 General Plan Growth Scenario
Ridesharing (Carpools and Vanpools)	10%
Transit (Public and Private)[6]	35%
Active Transportation	10%
Single-Occupant Vehicle	45%

- Create a comprehensive bicycle network
- Make walking pleasant and convenient
- Provide a range of transportation options
- Establish a strong TMA and implement TDM programs

TDM Approach

1) Require all employers or property owners seeking development entitlements to:
   - Implement a TDM program designed to achieve a 45% SOV mode share
   - Join the TMA
   - Establish a property/employer specific vehicle trip cap based on a 45% SOV mode share
   - Monitor and report annually vehicle trips generated to ensure they are below their trip cap
2) Institute a district wide vehicle trip cap:
   - Based on the vehicle capacity of the 3 entry points to North Bayshore during the peak period
   - Monitor vehicle trips at entry points biannually to determine when vehicle trips may be nearing the cap
3) Implement **congestion pricing** if goal not met

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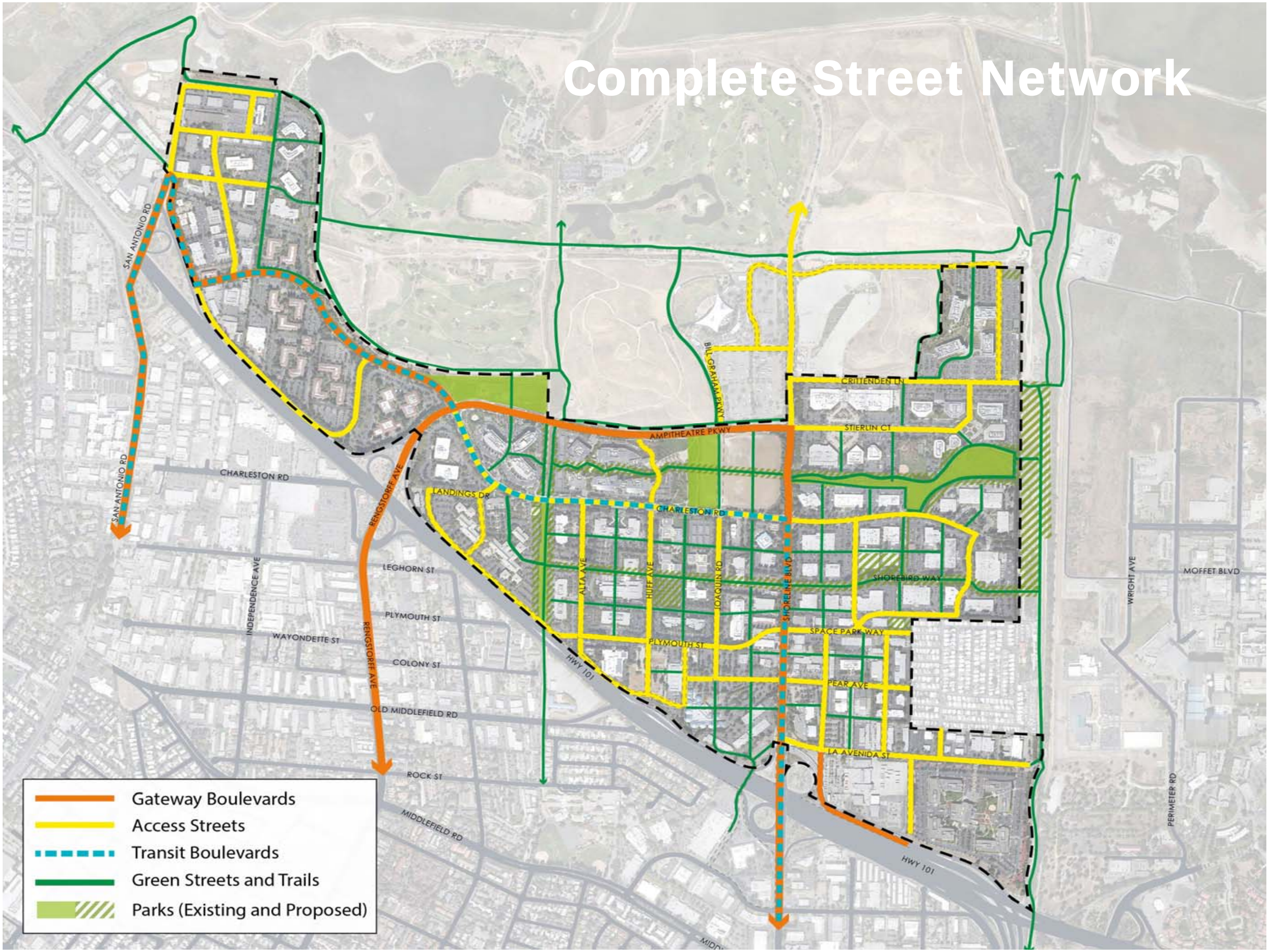
Complete Street Network



Case Study: North Bayshore

- Regulate building character:
  - Height, setback, stepback
  - Materials and design
  - Form Based Code
- Manage traffic directly:
  - Cap vehicle trips
  - Require TDM
  - Limit parking
- Monetize Trip Reduction
- Design for pedestrians and transit first
- Change performance metrics and analysis guidelines

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Parking Approach

- No minimums
- 2.7 spaces per 1,000 maximum for office/R&D
- No reserved parking
- Specific requirements for carshare, carpool, and clean vehicles
- Parking supply must match trip reduction commitment

Current Update

- No minimums for residential
- Required unbundling
- Debate about maximums

Future Proofing:

- Retrofitable: Floor-to-ceiling, level floors, removable ramps
- No requirement for parking areas to accommodate humans

Google Dome

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	Corrid or Review	Repo rt 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 area 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

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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

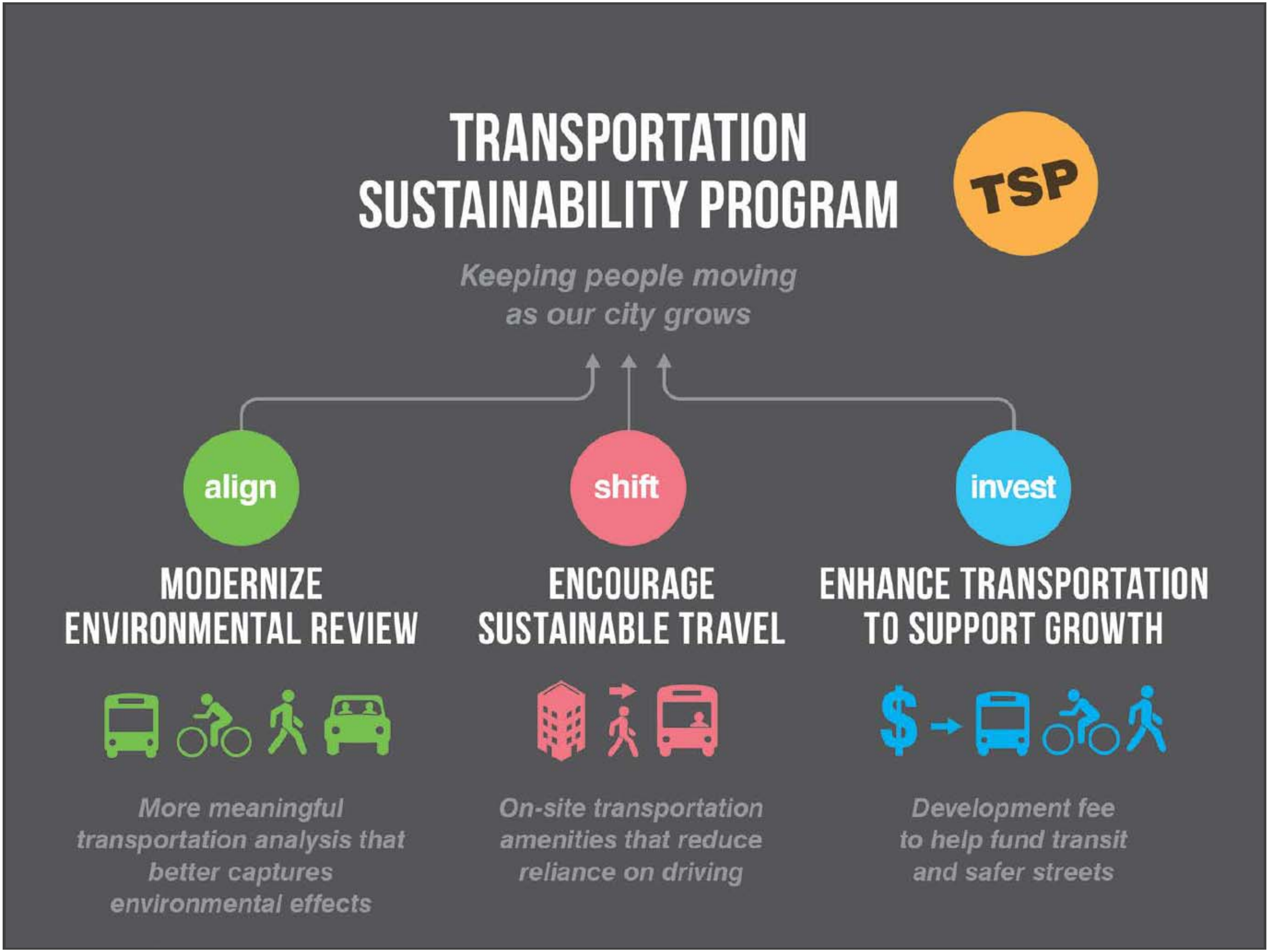
- GIS mapping
- Transportation Demand Management reporting data
- Big Blue Bus GPS data
- Public perception surveys
- Traffic counts

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.

Case Study: San Francisco


TRANSPORTATION SUSTAINABILITY PROGRAM
TSP
Keeping people moving as our city grows
align
MODERNIZE ENVIRONMENTAL REVIEW
More meaningful transportation analysis that better captures environmental effects
shift
ENCOURAGE SUSTAINABLE TRAVEL
On-site transportation amenities that reduce reliance on driving
invest
ENHANCE TRANSPORTATION TO SUPPORT GROWTH
$
Development fee to help fund transit and safer streets

TDM Ordinance Targets

Based on # off-street vehicular parking spaces

Residential and Office Projects

- 0 to 20 spaces = 13 points
- Every additional 10 spaces = 1 point

Retail

- 0 to 4 spaces = 9 points
- Every additional 2 spaces = 1 point

Other Land Uses

- To be determined, but similar in concept

Proposed Exemptions*

Residential:

- 100% Affordable Housing
- < 10 dwelling units

Non-Residential:

- <10,000 sf

*Only if the projects do not exceed required or allowable amount of off-street vehicular parking.

Grandfathering

No building permit sign-off from Planning = subject to Ordinance

TDM Tool

Menu of 30 Measures:

Under the control of the developer or tenant

All reduce single occupancy vehicle trips and vehicle miles traveled (VMT)

- Active Transportation Related (10)
- High Occupancy Vehicle (5)
- Parking (4)
- Design (3)
- Car-Share (3)
- Family (2)
- Land Use (2)
- Management (1)

Range of Effectiveness

Low: 1 point — Medium: 3 points — High: 10+ points

Wayfinding Signage

Showers and Lockers

Bicycle Parking Beyond Code

Public Transit Subsidy

Reduced Parking Supply

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.

What about Montgomery County?

Photo: Montgomery Co Economic Dvpt

Ensure alignment with goals

- Direct development to established communities and town centers
- Preserve parkland and agriculture
- Provide better transportation choices

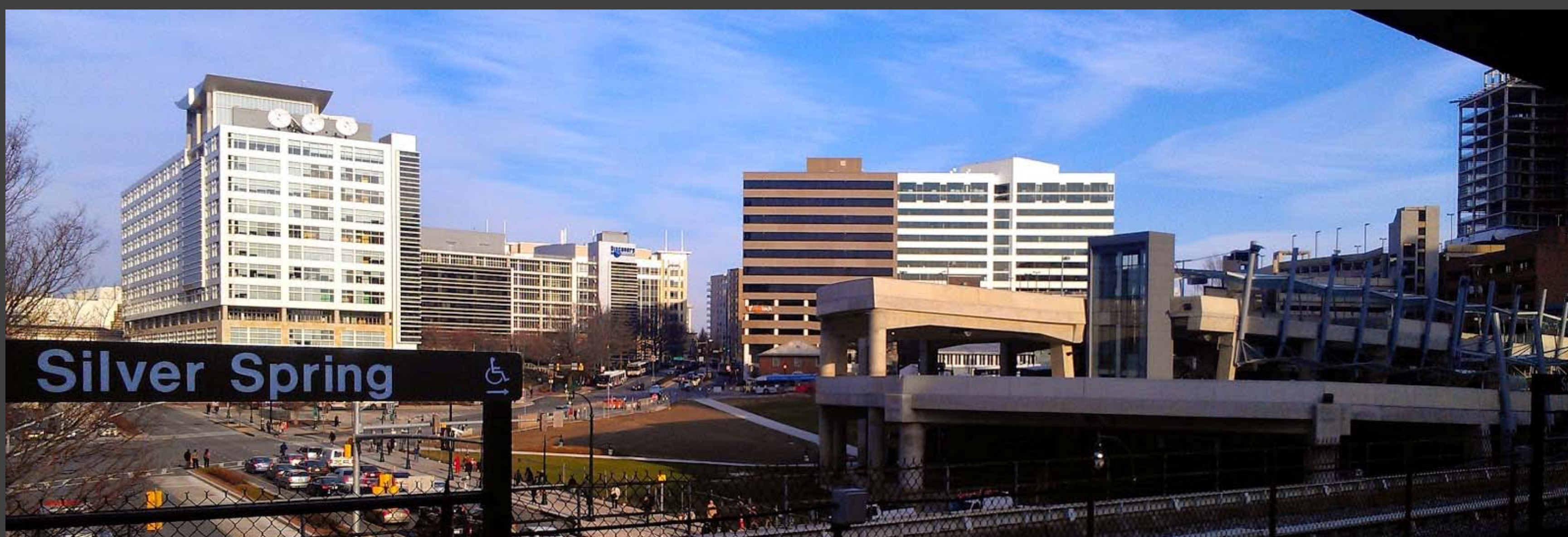


Image: Urbanmidatlantic

Focus on Transportation Demand Management

- Allow additional entitlement in exchange for trip reduction
- Require:
  - Reduced parking
  - Paid parking or parking cashout with $5/day floor
  - Unbundled parking from commercial and residential leases
- Create TDM menu, with points assigned based upon program effectiveness. Require minimum point achievement.
- Consider:
  - Eliminate density controls in infill areas
  - Establish motor vehicle trip or VMT cap
  - Create traffic cap-and-trade program

Focus on Parking

- 42% of all public parking spaces in Silver Spring and 28% in Bethesda are empty at any given time.
- Eliminate all minimum parking requirements in mixed use and transit accessible areas. Replace with parking maximums.
- Require sharing and unbundling.
- Require pricing or cashout on a daily basis, with $5/day floor.
- Consider a per parking space impact fee, one-time and annual.

Adjust Impact Fees

- Focus on *marginal* cost of new development
- Adjust based upon actual Vehicle Miles Traveled, including Transportation Demand Management
- Reward parking reduction
- Use resulting fee revenue wherever it creates greatest benefit, *not* adjacent to project.

Rethink Congestion

- Drop LOS. Replace with:
  - Per capita Vehicle Miles Traveled
  - Person hours of travel
  - Corridor person travel time
  - Corridor person delay
- Decide where to put your congestion

For More Information

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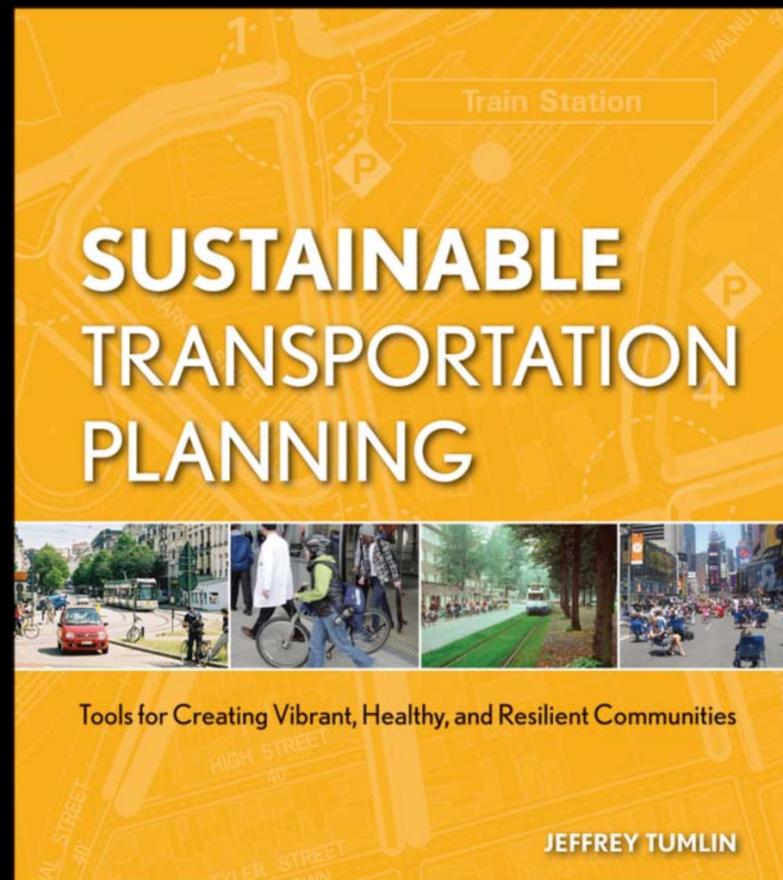

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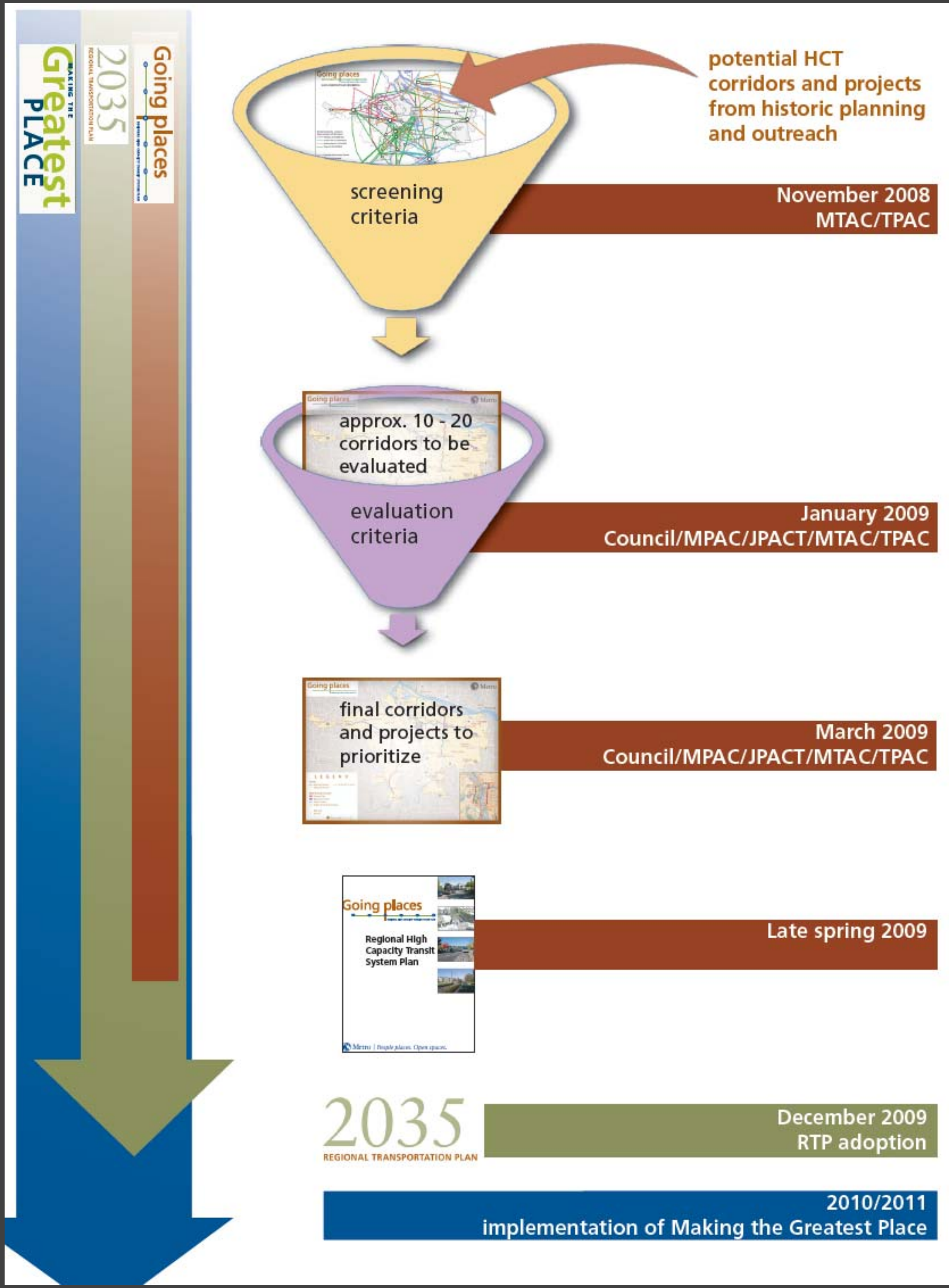
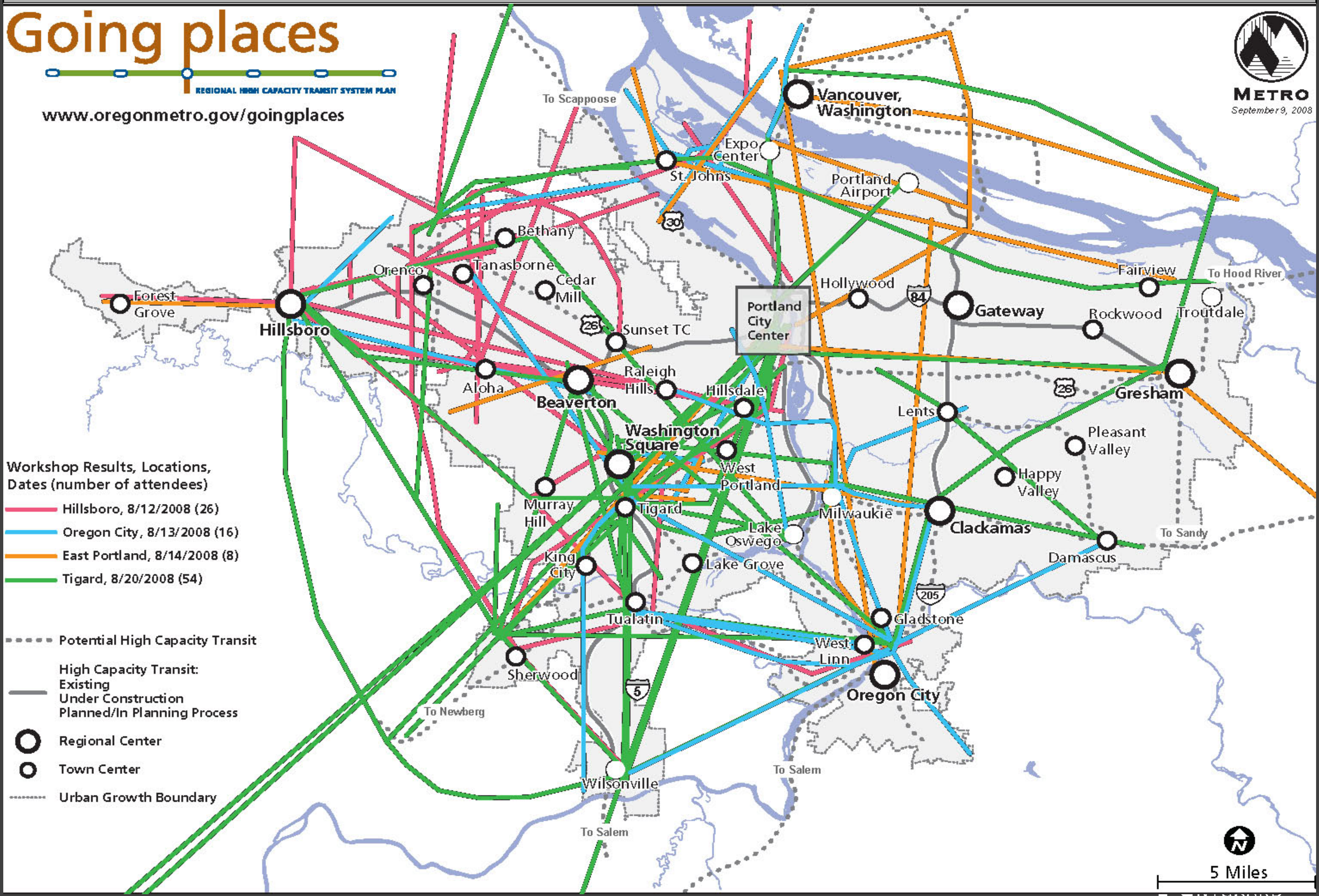
Case Study: Portland

Evaluating Opportunities



Possibilities…



Round I Screening

- Current and future ridership potential
- Connectivity & system benefit
- Cost & corridor availability
- Environment constraints
- Equity
- Congestion
- Alignment with 2040 Growth Concept
- Transit origins and destinations

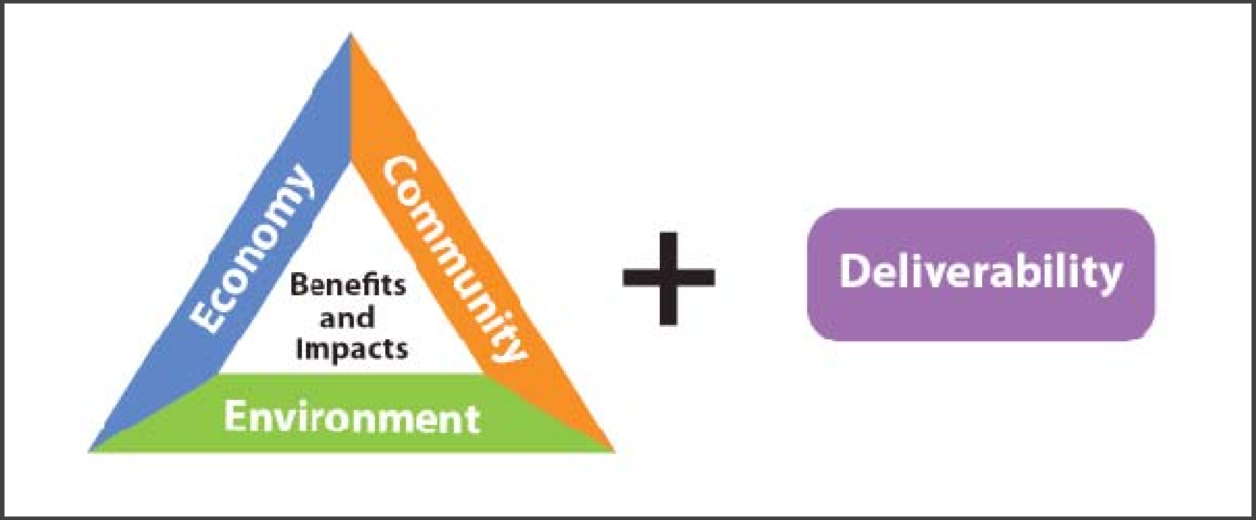

Going places
REGIONAL HIGH CAPACITY TRANSIT SYSTEM PLAN
DISCUSSION DRAFT
01/06/2009
Metro
Portland Central City: To be determined through Central City Plan update
LEGEND
Transit
High Capacity Transit (2009)
Planned High Capacity Transit (adopted)
Existing Frequent Bus Route
HCT* Corridors
Corridors Recommended For Advancement
Corridors Not Recommended For HCT Advancement
RTC HCT Corridors
Potential Corridor Extensions (corridors extending to neighboring cities to be measured by travel demand)
2040 Growth Concept
Central City
Regional Center
Town Center
Urban Growth Boundary
Railroad
School
Parks/Open Space
County Boundary
*High Capacity Transit (HCT) can include:
-Light Rail
-Bus Rapid Transit
-Rapid Streetcar
-Commuter Rail
0
2
4
Miles
Vancouver
Camas
Washougal
St. Johns
Forest Grove
Hillsboro
Orenco
Tanasbourne
Bethany
Cedar Mill
Sunset Transit Center
Aloha
Beaverton
Raleigh Hills
Hillsdale
Washington Square
West Portland
Murray Hill
Tigard
King City
Tualatin
Sherwood
Wilsonville
Lake Oswego
Lake Grove
Milwaukie
West Linn
Gladstone
Oregon City
Clackamas
Happy Valley
Damascus
Lents
Pleasant Valley
Hollywood
Gateway
Rockwood
Fairview
Troutdale
Gresham
To Hood River
To Sandy
To Newberg
To Salem
To Scappoose

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