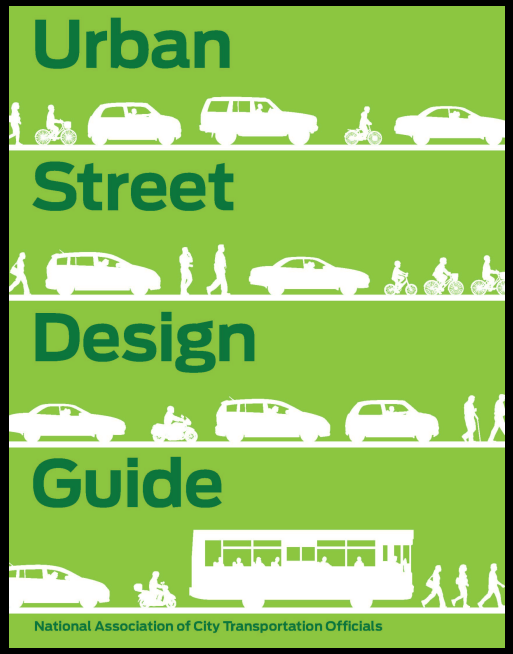
4-4-2014

An Introduction to the NACTO Urban Street Design: Changing the DNA of City Streets

Peter Koonce
Portland Bureau of Transportation



Overview of the NACTO Urban Street Design Guide

Peter Koonce, P.E.

April 4, 2014

What is NACTO?

- Coalition of transportation professionals with the intent to:
  - facilitate the exchange of transportation ideas, insights and best practices among large cities,
  - improve the state of the practice for (*multimodal*) street design

City Staff talking to City Staff

How NACTO fits

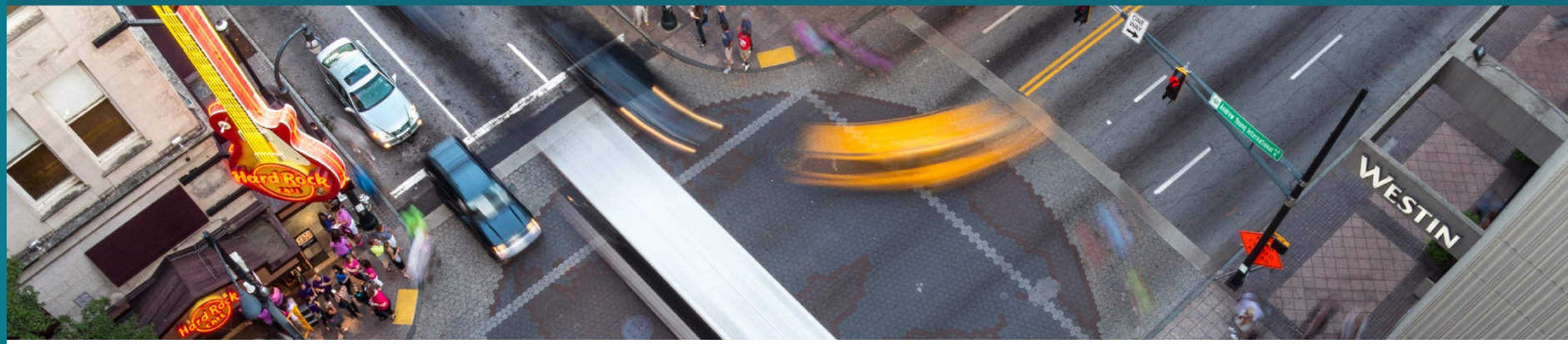
- AASHTO – State Highway
  - Geometric Design (Green Book)
  - Bike Guide
- NACE – County Engineers
- ITE – Transportation Professionals/ Engineers

Who is involved?

- *Member Cities*
  - Atlanta Baltimore Boston Charlotte Chicago Denver
  - Detroit Houston Los Angeles Minneapolis New York
  - Philadelphia Phoenix Portland San Diego
  - San Francisco Seattle Washington DC
- *Affiliate Members*
  - Arlington,VA Austin Burlington Cambridge Hoboken
  - Indianapolis Louisville Memphis Oakland
  - Salt Lake City Somerville MA Ventura CA
- State Endorsement: ***Washington & Massachusetts***

Design Controls

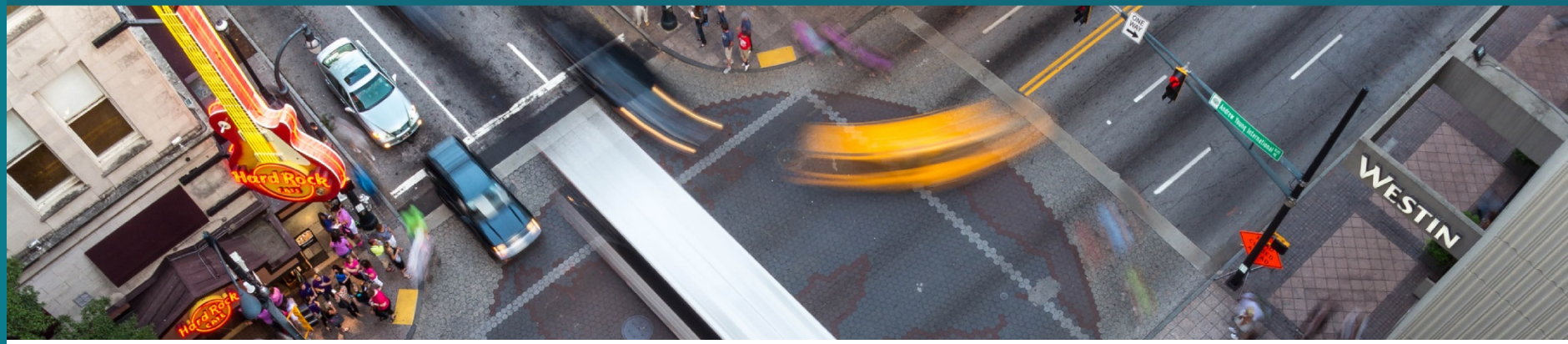
DESIGN CONTROLS



Design Speed
Design Vehicle
Design Hour

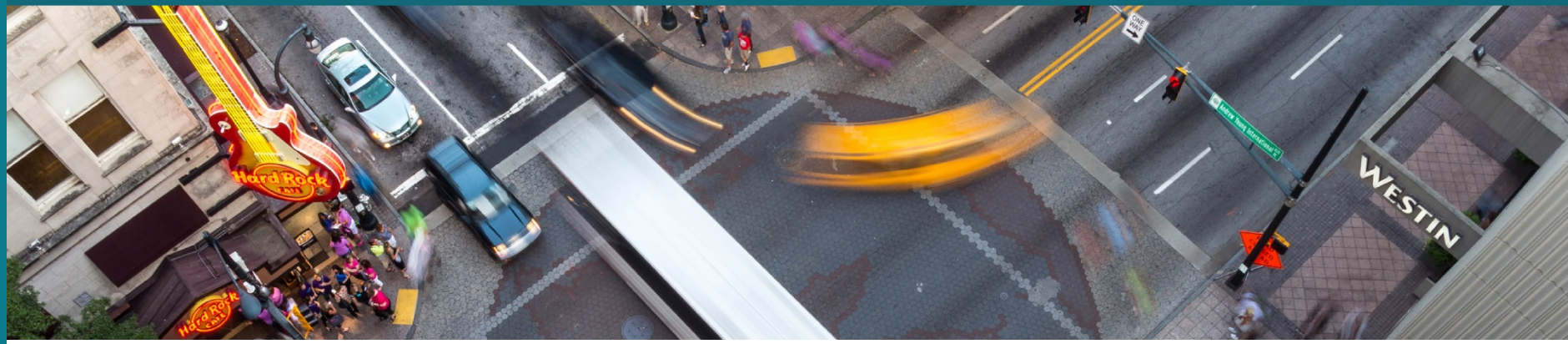
Design Year
Performance Measures
Functional Classification

DESIGN CONTROLS



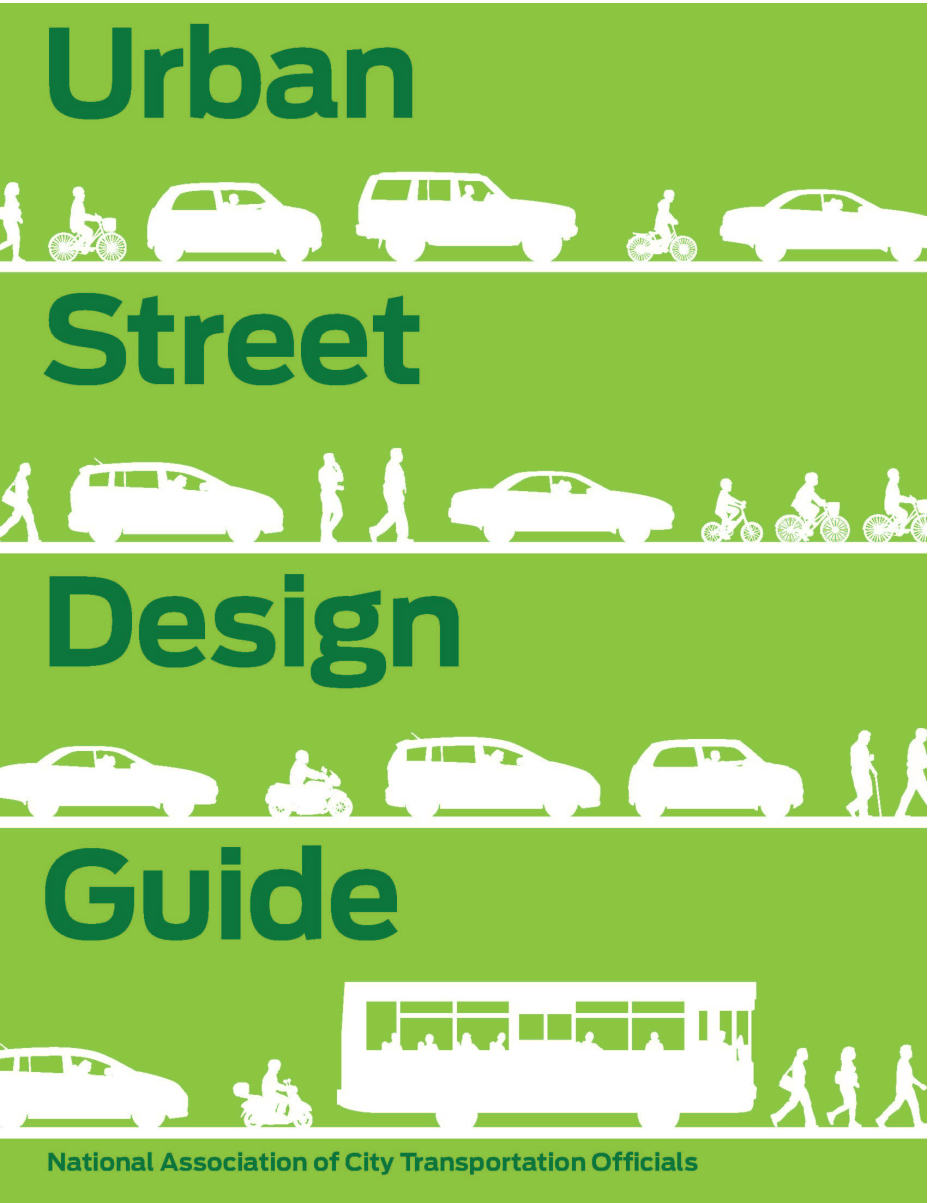
Design Controls should work towards your intended outcome, not against it.

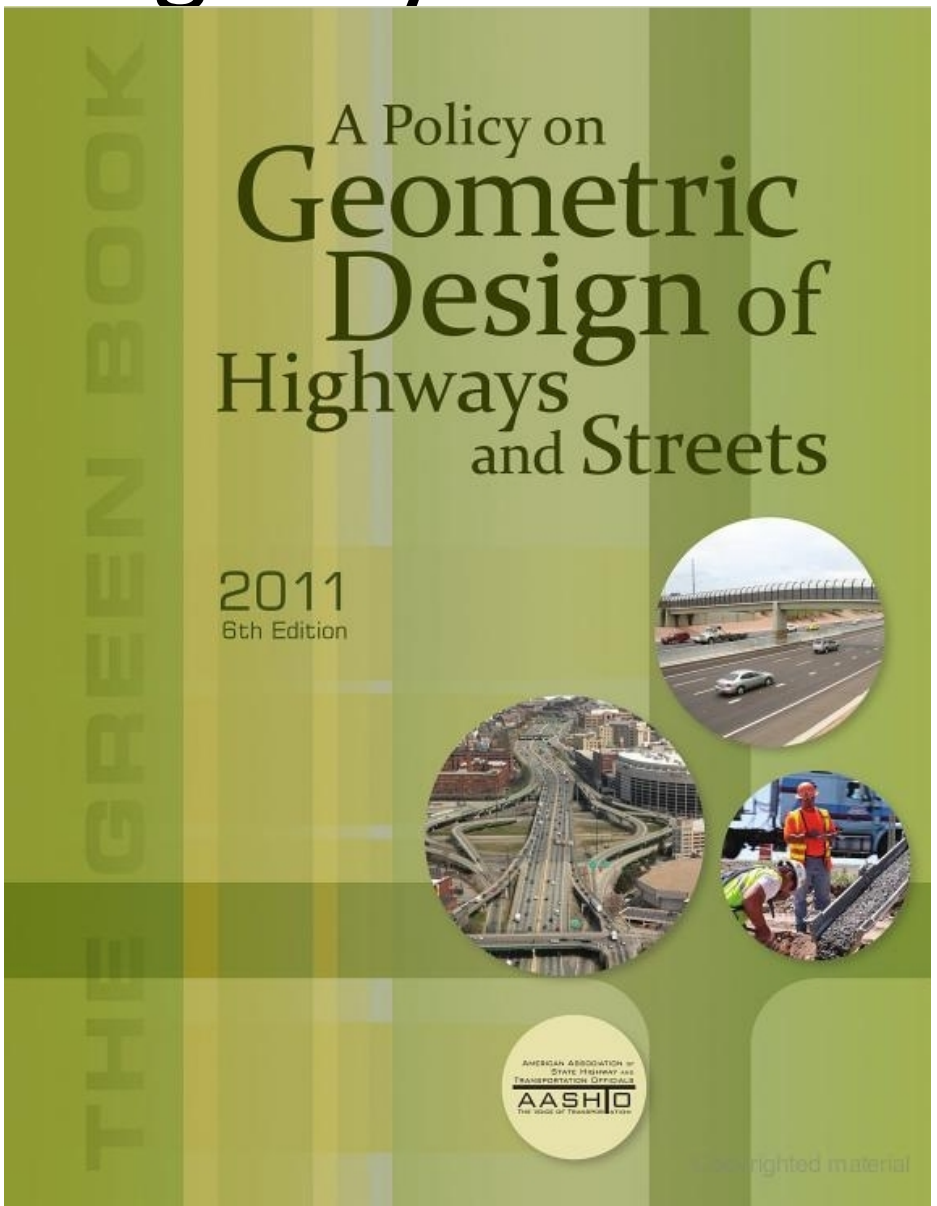
DESIGN CONTROLS



High-quality design for city streets and intersections relies on a keen understanding of ***the analytical processes and assumptions underlying those technical decisions that shape streets****.*

Contrast in Design Styles

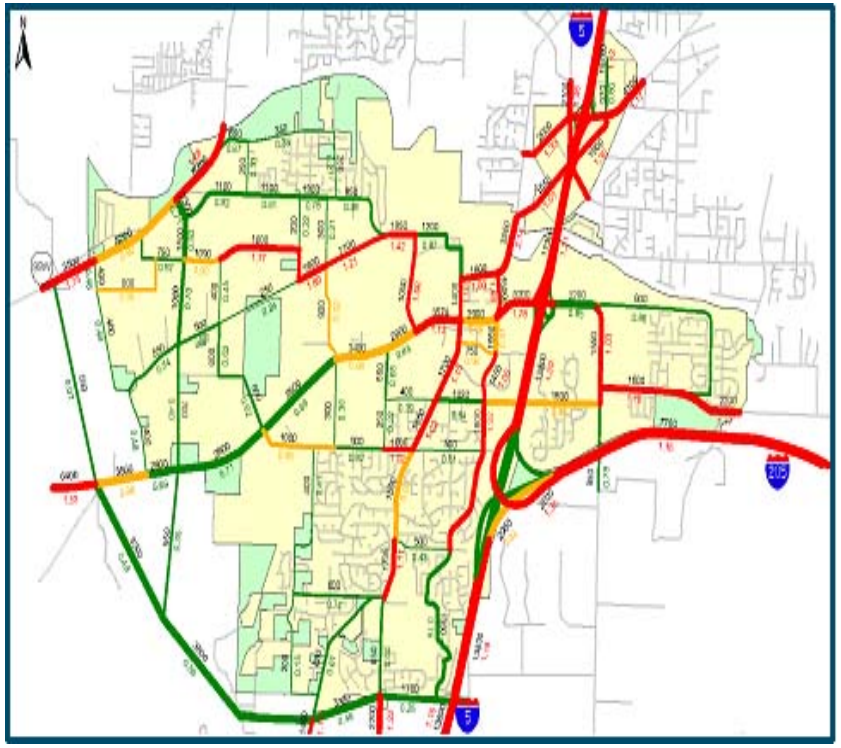




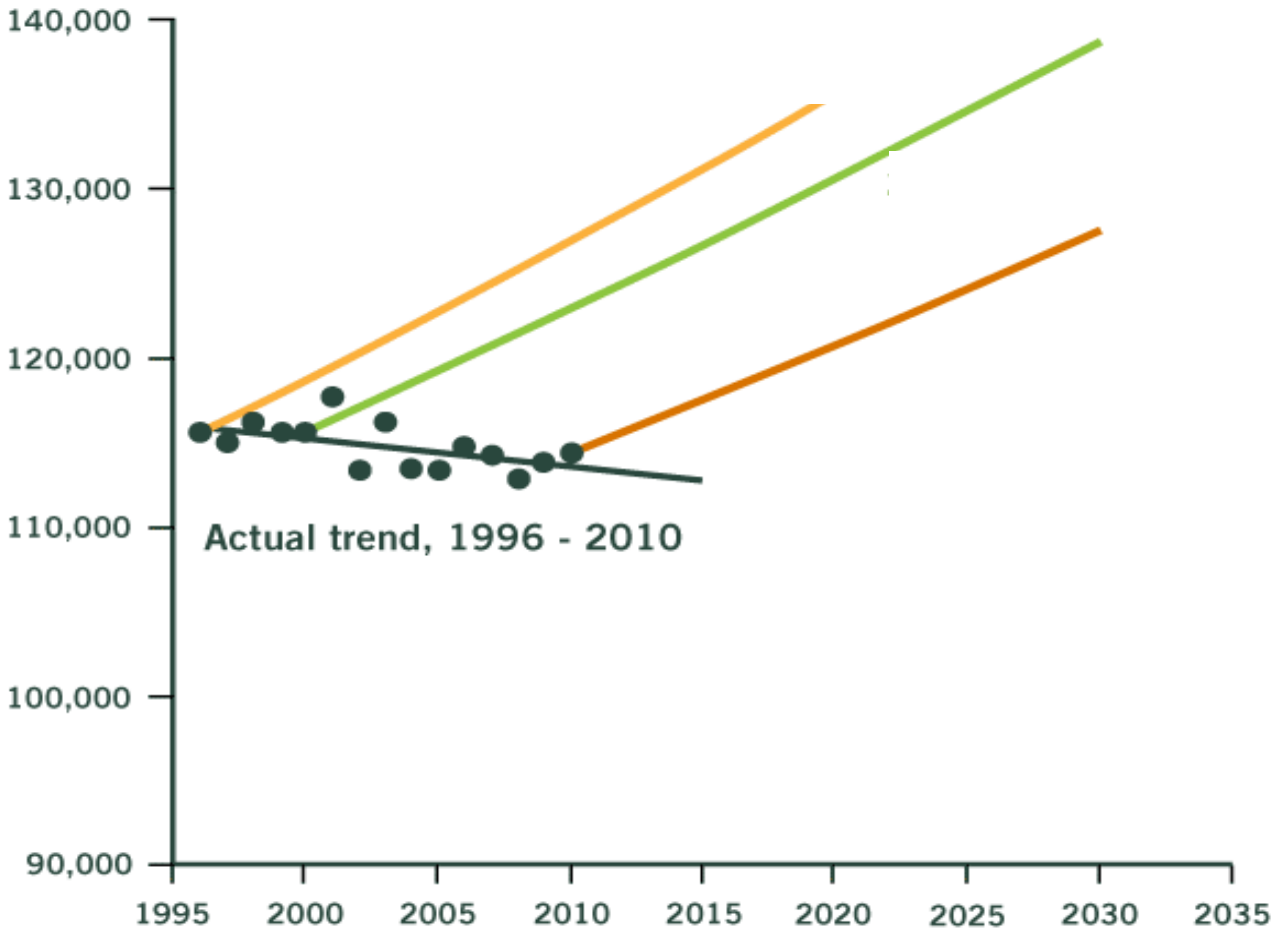
Design Year

Projection of Future Traffic Demands

"Many highway engineers believe the maximum design period is in the range of 15 to 25 years"



Design Year vs. Actual Trend



Sightline INSTITUTE

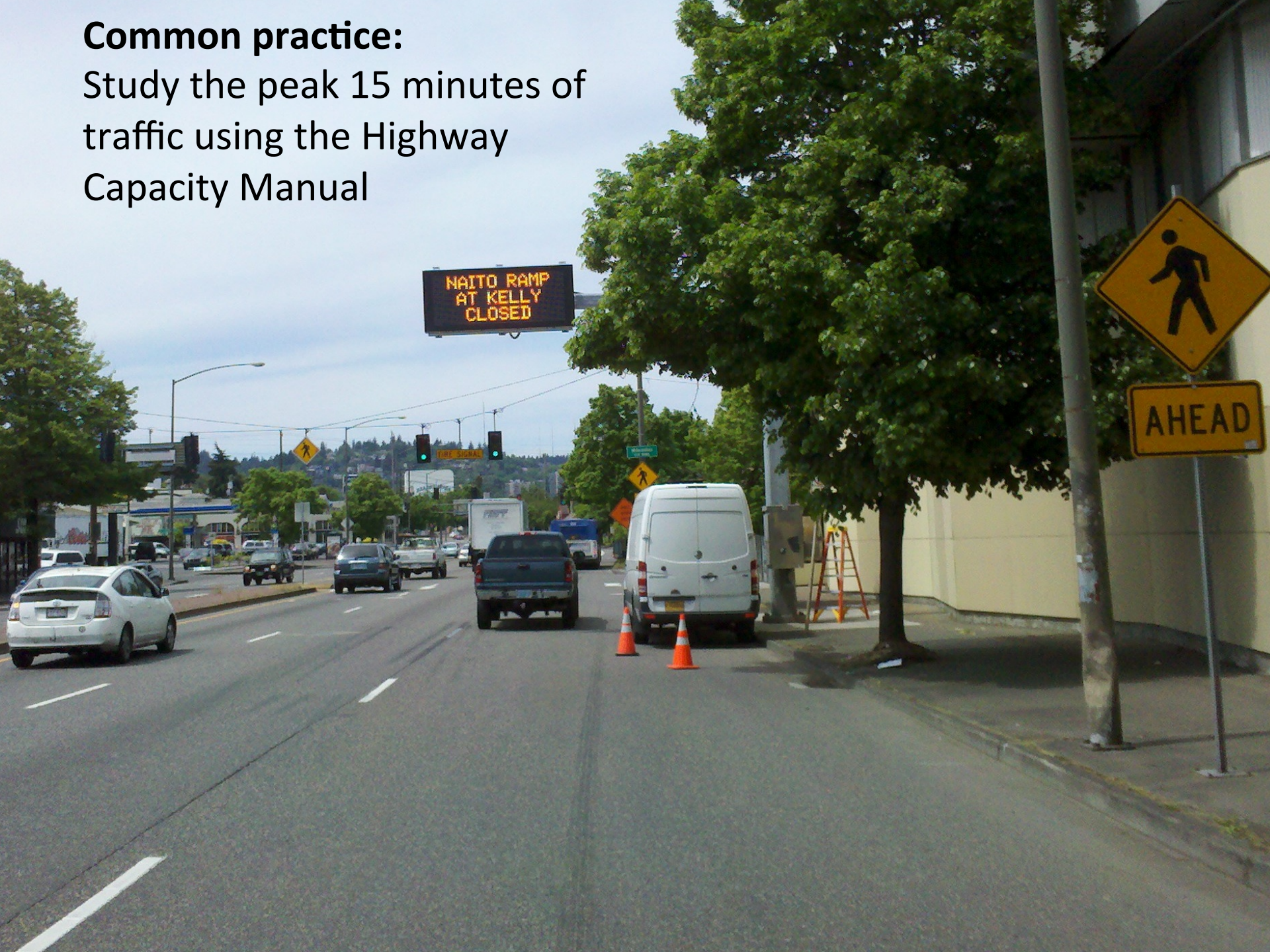
Problems with Design Year

- Unconstrained vehicle demand for 20+ years
- Straight line growth projection
- Underlying goals of congestion reduction and highway project selection


Taylors Fy. Rd.
To Capitol Hwy.
NO TURN ON RED
NO TURN ON RED

Design Hour

Common practice:
Study the peak 15 minutes of traffic using the Highway Capacity Manual

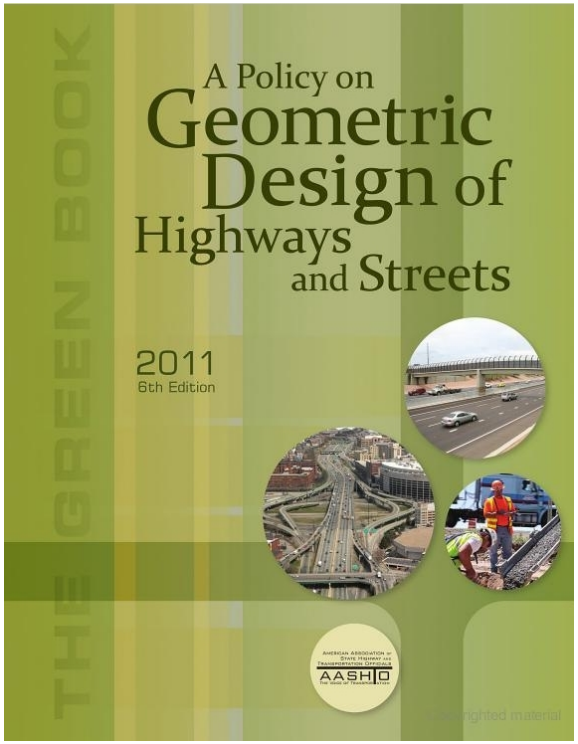


Peak Hour Design

"in urban design, the 30th highest hourly volume can be a reasonable representation of daily peak hour"

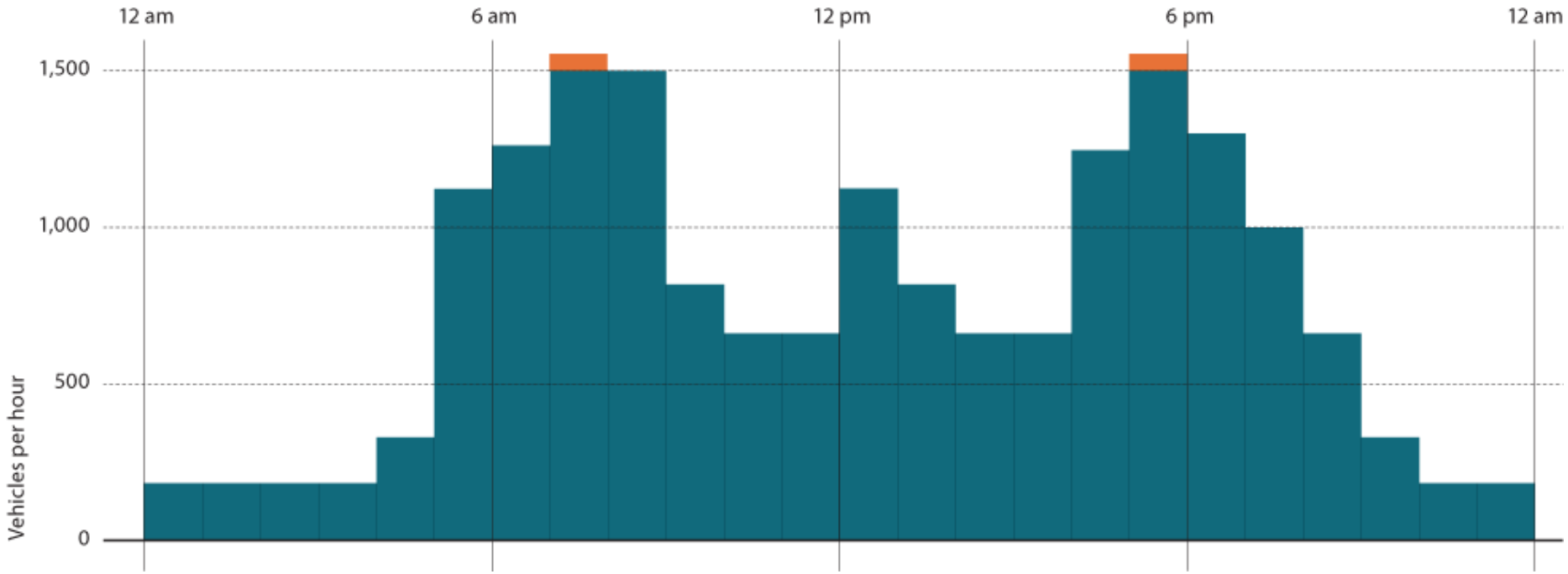
" the use of average hourly traffic would result in an inadequate design"

– *AASHTO 2.3.2*

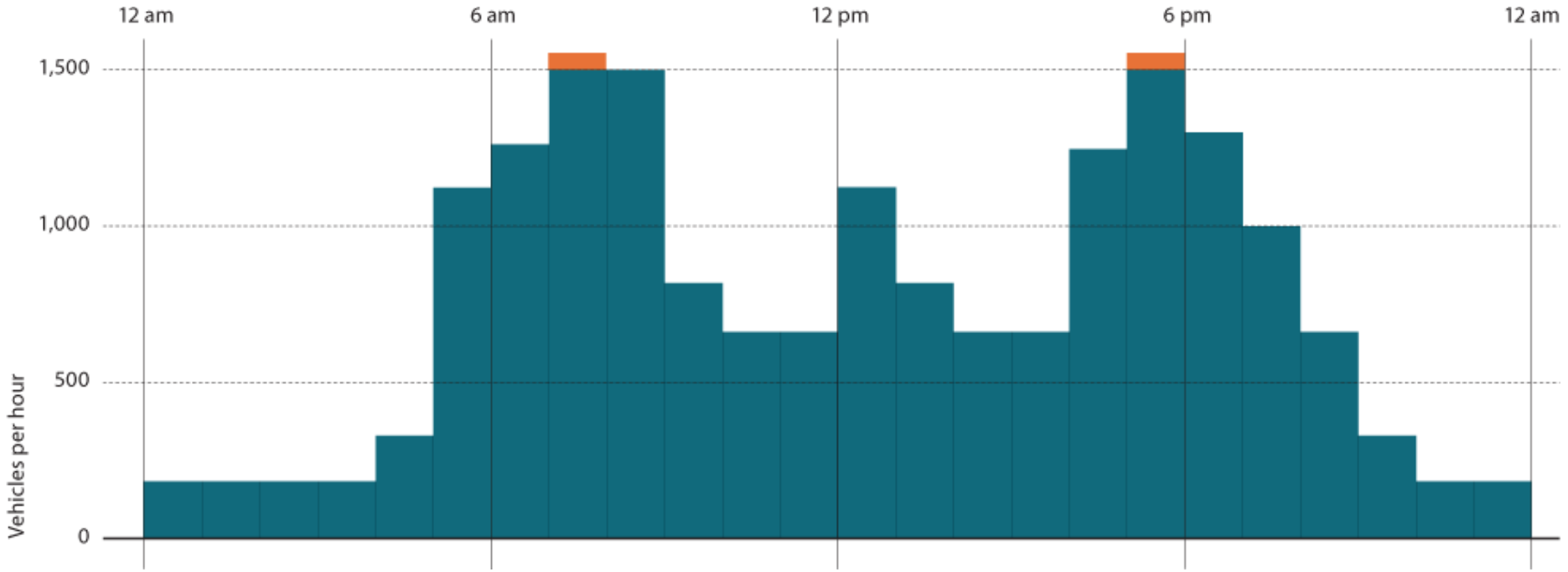


NACTO Recommends

- Assess more than the peak hour or 15-mins
- Identify peak spreading opportunities



Design for Hours, not Minutes



Streets designed for peak intervals of traffic may fail to provide a safe and attractive environment during other portions of the day.

From 8 AM to 8 PM

8:00 AM
Mobility

12:00 PM
Accessibility focus – pedestrians during the lunch hour

8:00 PM
Neighborhood emphasis – bicycle and other local traffic

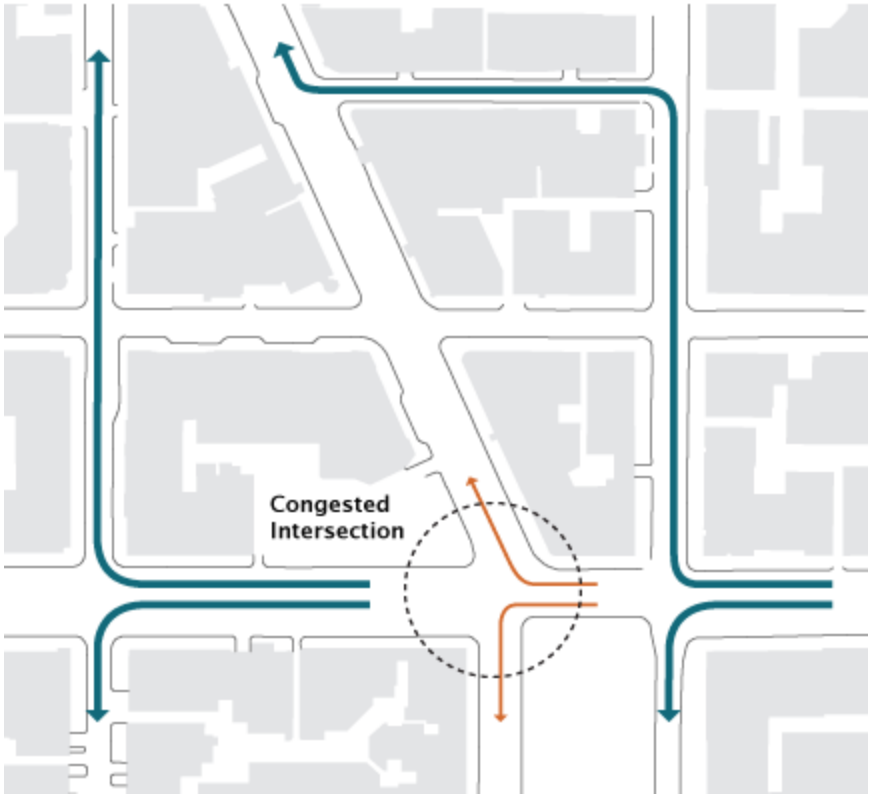
Intersection Design Principles

Intersection Design Principles

- Design intersections as compact as possible
- Analyze systems not intersections
- Integrate Time & Space
- Intersections are shared spaces
- Utilize excess space effectively
- Design for the future

Analyze Systems not Intersections

- Consider completeness of the system
- Provides opportunities for engineers to make “improvements”



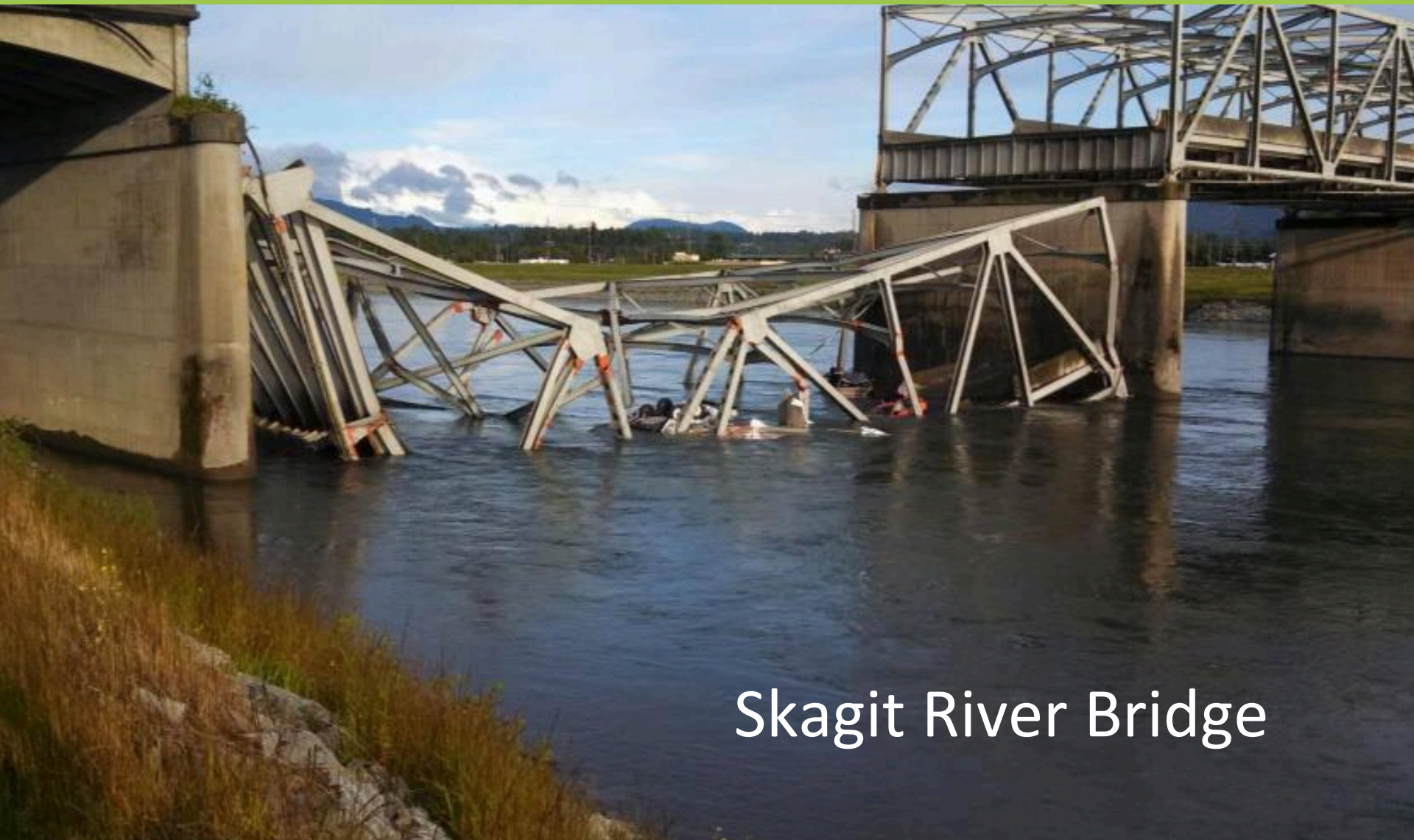
Integrate Time & Space

"balance needs of and functions of different time periods"

"Streets designed for peak intervals may fail to provide a safe and attractive environment"

Performance Measures

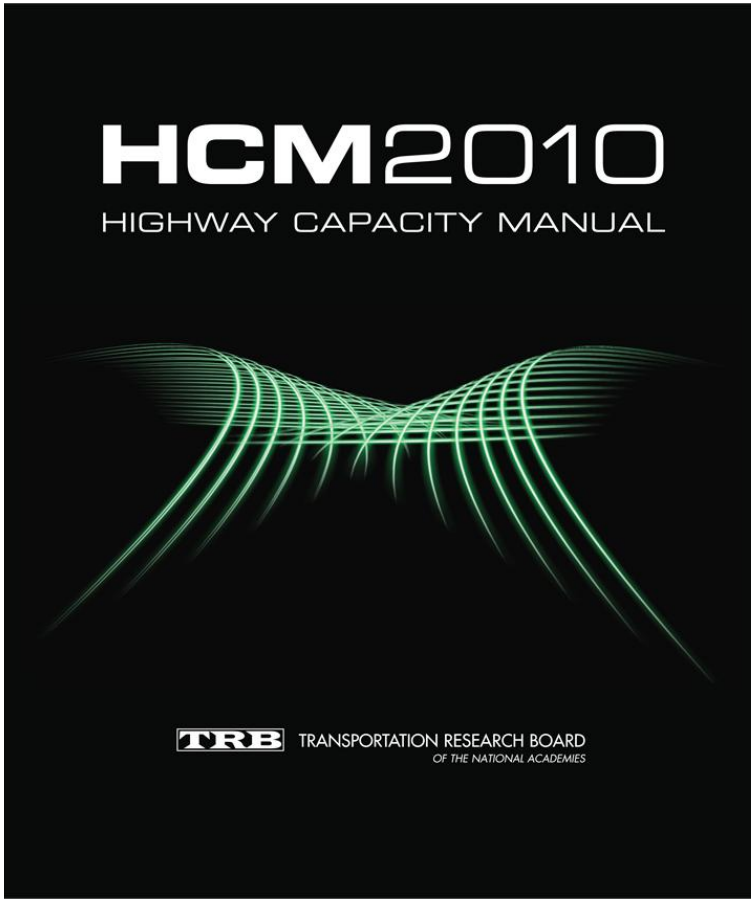
Performance Measures: Definition of Failure



Highway Capacity Manual

Highway Capacity Manual defines failure as the breakdown of flow; the threshold where you reach failure at signalized intersections

80 second per vehicle

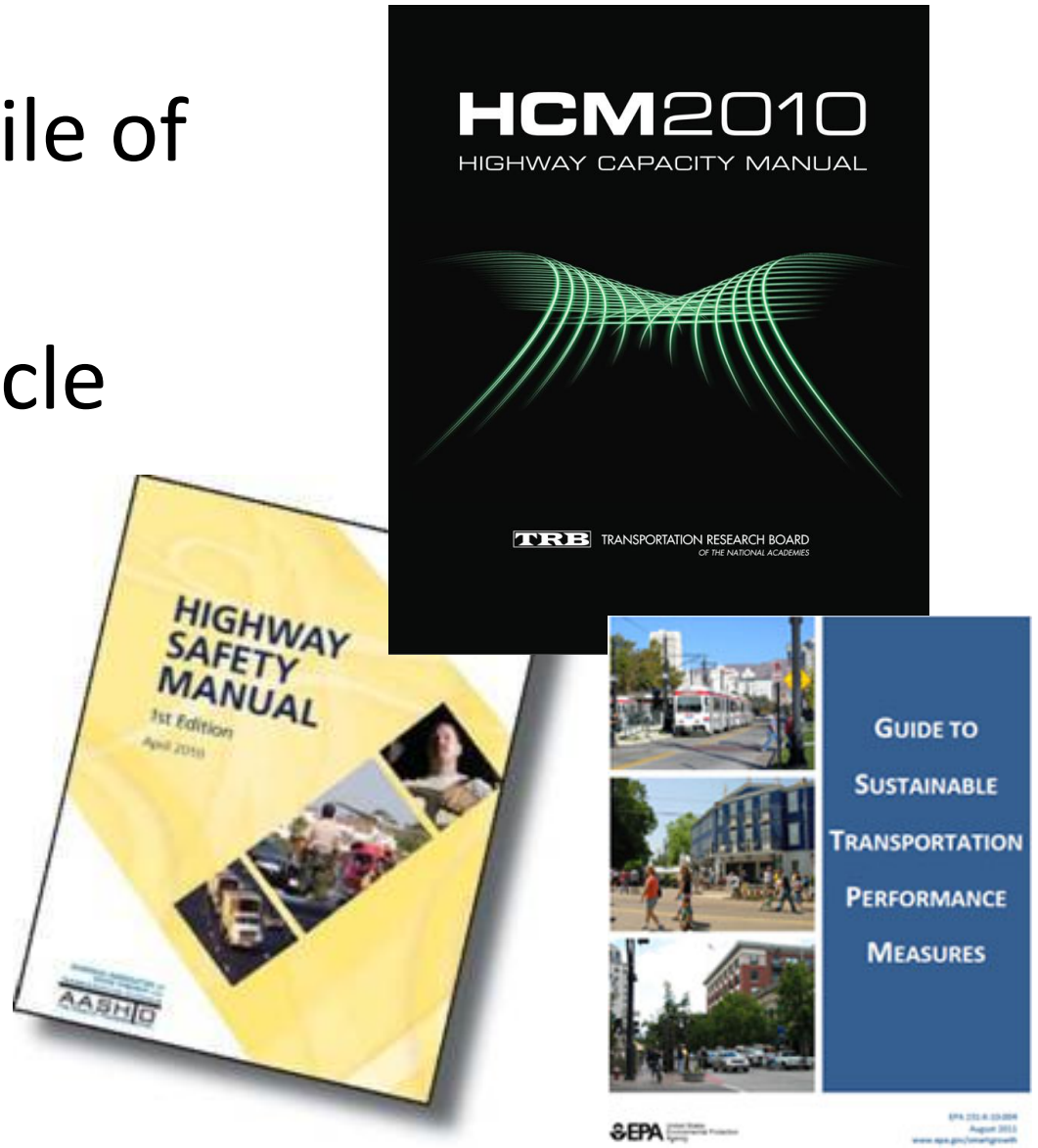


Level of Service at Signalized Intersections is for Cars

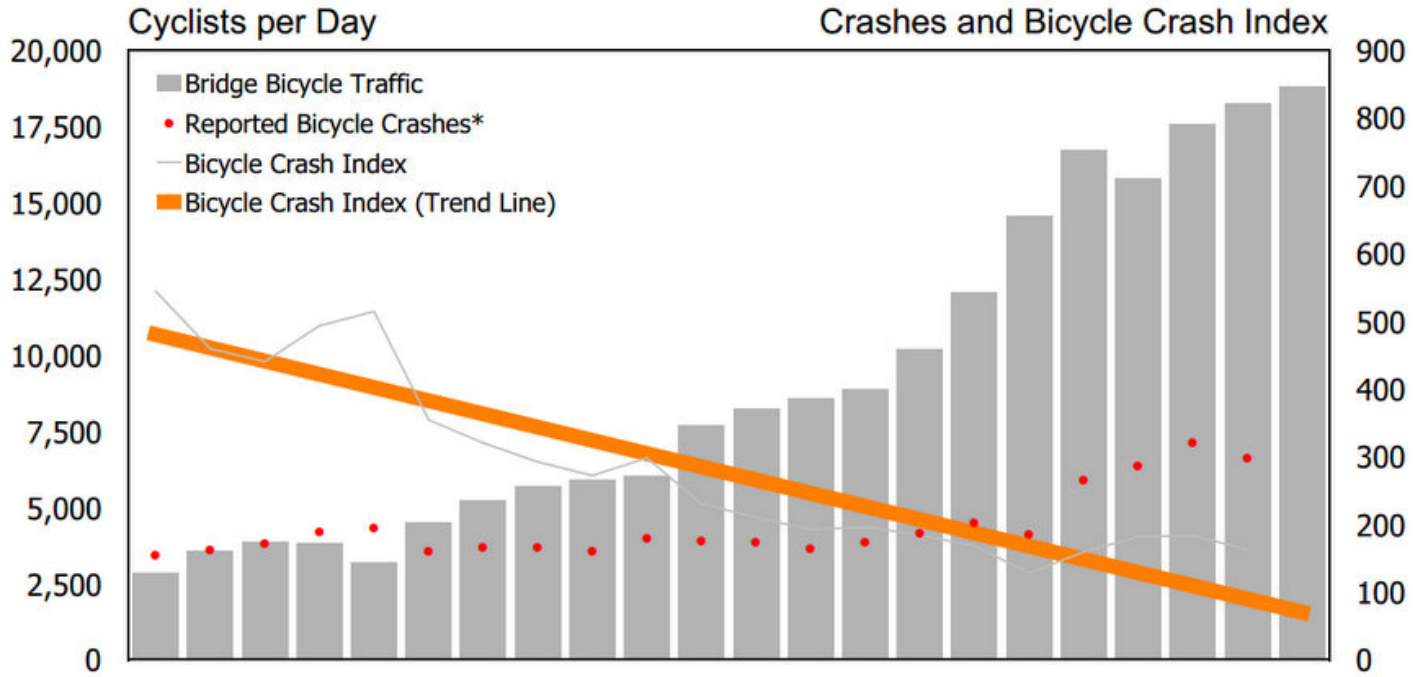
- Today's methodology doesn't consider *person delay or other goals*
- Transit, pedestrian crossing, or bikes are largely forgotten in these traditional methodologies/ measures.

Potential Performance Measures

- Crashes per mile of highway
- Delay per vehicle
- Mode split



Combined Bicycle Traffic over Five Main Portland Bicycle Bridges Juxtaposed with Bicycle Crashes



	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2
Bridge Bicycle Traffic	2,850	3,555	3,885	3,830	3,207	4,520	5,225	5,690	5,910	6,015	7,686	8,250	8,562	8,875	10,192	12,046	14,563	16,711	15,794	17,576	18,257	18
Reported Bicycle Crashes*	155	163	171	189	195	160	167	166	161	179	175	173	164	174	188	203	186	265	287	321	297	
Bicycle Crash Index	544	459	440	493	514	354	320	292	272	298	230	210	192	196	184	168	128	159	182	183	163	
Bicycle Fatalities	2	0	4	3	2	1	5	3	0	0	5	0	4	1	4	0	6	0	4	0	2	

Extrapolated from peak period counts

Year

"Crash Rate" represents an indexing of annual reported crashes to daily bicycle trips across the four main bicycle bridges.
*2008, 2009 Reported Bicycle Crashes data reflects a decision by the Portland Police Bureau to lower the threshold for reporting bicycle-involved crashes. Th
change, beginning in January 2008 means that crashes previously unreported by Portland Police are now entering the reporting system. There have been no
indications in the operation of our system that leads the city to condude that the increase in reported crashes is representative of changes in actual crash ac
in the city.

GUIDE TO SUSTAINABLE TRANSPORTATION PERFORMANCE MEASURES

EPA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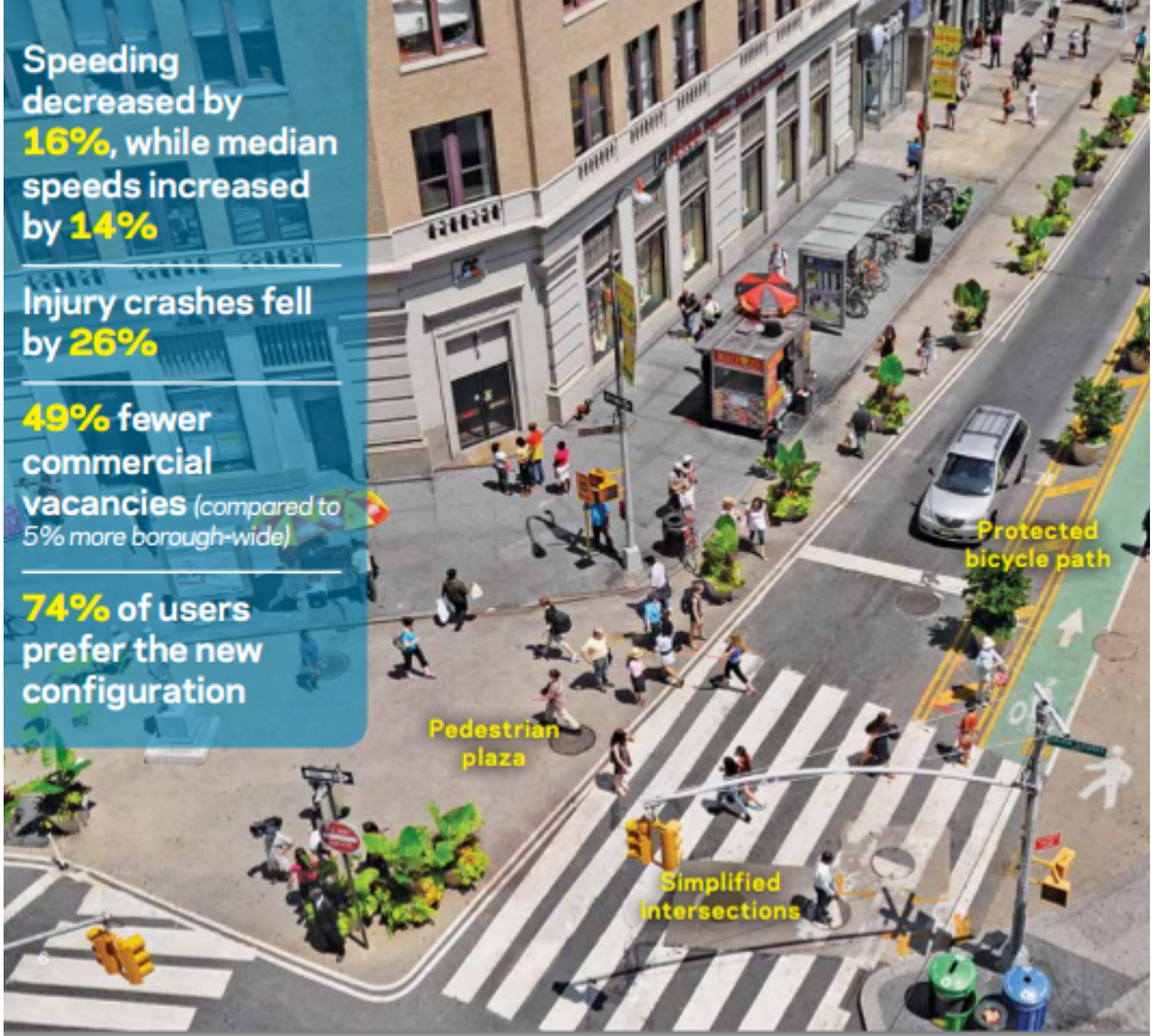
USDG: Performance Measures by Mode


Speeding decreased by 16%, while median speeds increased by 14%
Injury crashes fell by 26%
49% fewer commercial vacancies (compared to 5% more borough-wide)
74% of users prefer the new configuration
Protected bicycle path
Pedestrian plaza
Simplified intersections

Applying the USDG

- Requires us to challenge assumptions
  - Engineering details
  - Planning forecasts
- Use policies to change traditional practices

Thank you for your Time