WalkWorks

pennsylvania DEPARTMENT OF HEALTH

Complete Streets Webinar Series

Part 2: Complete Streets Best Practices Review:
Design Options for Making Your Streets Complete

Mid-Atlantic Regional PUBLIC HEALTH TRAINING CENTER
A Program of the Center for Public Health Practice

What is and Why WalkWorks?

- Collaboration of the Pennsylvania Department of Health and the University of Pittsburgh Graduate School of Public Health
- Mission: To improve health status by addressing chronic disease risk factors to prevent and reduce obesity, diabetes, heart disease and more
  - Increase physical activity in built environment through development of walking routes
  - Influence policy by funding development of active transportation plans designed to increase opportunities for physical activity
- Method: Community-based partners, municipalities, planning organizations

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Today's presenter

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Smart Growth America
Making Neighborhoods Great Together

National Complete Streets Coalition

Most presentation content courtesy of the National Complete Streets Coalition

www.completestreets.org

Three-part series on Complete Streets

- Part 1: Complete Streets basics and benefits (held on March 28, 2019)
- Part 2: Best practices in Complete Streets (today's webinar)
- Part 3: Complete Streets planning and policies, Thursday, April 18

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Best Practices for Design of Complete Streets


Fixed controls
• Geography


Fixed controls
• Climate


Fixed controls
• Climate

Design controls

- Functional classification
- Design speed
- Lane & roadway width
- Capacity & delay
- Intersection design
- Design vehicle

Old paradigm: “passive” design

- “Forgives” behavior through design, assumes worst case
- Designed for high speeds and high volumes
- Encourages high-risk behaviors from all users:
  - Driving too fast; crossing mid-block; bicycling on sidewalks
- Limits land use and building types, street life

New paradigm: “proactive” design

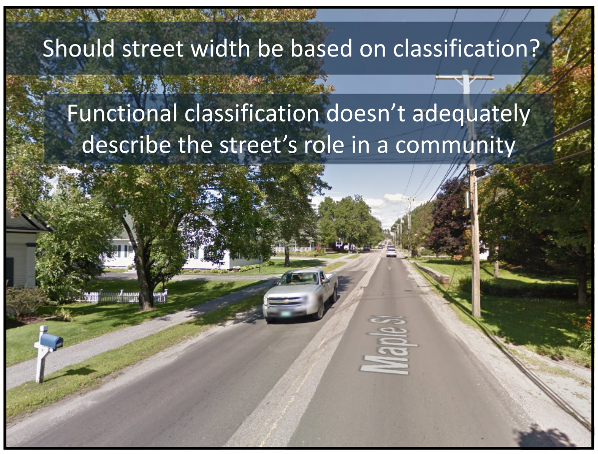
- Changes behavior through design
- Guides users through physical and environmental cues
- Slows vehicle speeds
- Encourages walking, bicycling, transit use
- Key to successful Complete Streets implementation

Minimum design often doesn’t mean quality design for walking and bicycling

- Every mode needs quality accommodations
  - Safe
  - Direct
  - Comfortable, low-stress
- Design to maximize these goals for walking and bicycling rather than designing to minimum requirements

Functional classification

Should street width be based on classification?



Context zones

Duany Plater-Zyberk and Company

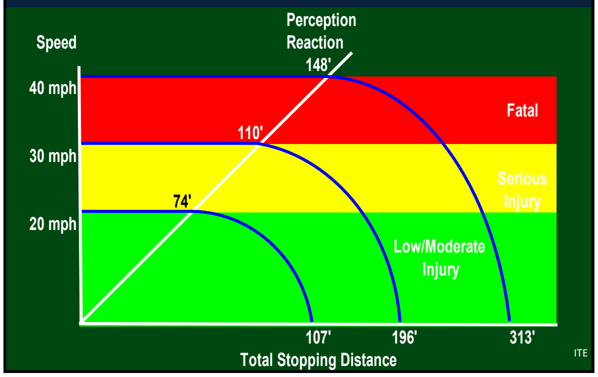
Context-based, descriptive terms

San Francisco's street types

- Commercial
  - Downtown commercial
  - Commercial throughways
  - Neighborhood commercial
- Residential
  - Downtown residential
  - Residential throughways
  - Neighborhood residential
- Industrial
- Mixed use
- Special
  - Parkways
  - Park edge
  - Park interior
  - Multi-way boulevards
  - Ceremonial (civic)
  - Alleys
  - Shared
  - Paseos (ped only)

Speed

Speed & crash severity



ITE

Speed & pedestrian fatalities

Health Resources in Action/Tefft, 2013

How speed affects driver perception

PERIPHERAL VISION AT 10-15 MPH

Source: NACTO

How speed affects driver perception

PERIPHERAL VISION AT 20-25 MPH

Source: NACTO

How speed affects driver perception

PERIPHERAL VISION AT 30-35 MPH

Source: NACTO

How speed affects driver perception

PERIPHERAL VISION AT 40+ MPH

Source: NACTO

Speed impacts interactions

Drivers less likely to stop for people at crosswalks when driving at 30 mph +

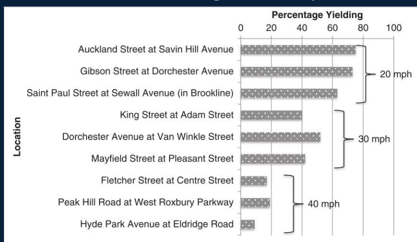


FIGURE 4 Driver speed and yielding compliance at nine study locations in Boston and Brookline.

Source: Bertulis and Dulaski, 2014.

Conventional design

Operating speed

=

Design speed

=

Posted speed

Complete Streets

Target speed

=

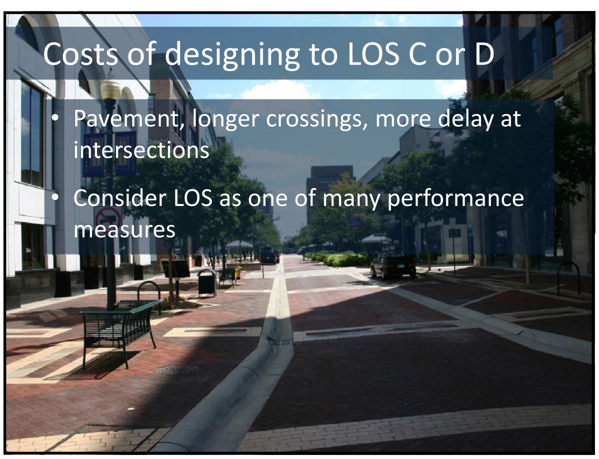
Design speed

=

Posted speed

To reduce operating speed:

- Narrower lane widths
- Narrower roadway
- Add “friction” with on-street parking, landscaping
- Space and synchronize signals for moderate speeds
- Smaller curb radii
- Reduced “shy distance” from median
- No superelevation
- Design of right turn lanes
- Horizontal deflection: curb extensions, chicanes
- Vertical deflection: speed humps, tables
- Textured paving
- Coordinate with building design to constrain sightlines



Costs to control operating speeds

- Design to E LOS → less pavement = less cost
- Narrower travel lanes → less pavement = less cost
- Signal progression → cost to interconnect

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- Raised medians → include in project scope

Medians and pedestrian crossings:

- May reduce pedestrian crashes by 46% at marked locations
- May reduce pedestrian crashes by 39% at unmarked
- May reduce driver crashes by 39%
- Enhance visibility
- Reduce speeds

Consider medians:

- Multi-lane roadways
- Urban and suburban
- Mixture of people walking and driving (12k ADT)

Design:

- 8-10’ preferred, 6’ minimum

Costs to control operating speeds

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- On-street parking → revenue from meters

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- On-street parking → revenue from meters
- Rightsizing number and width of lanes → minimal costs with resurfacing

Lane and roadway width

Do we have to widen roads to fit everything?

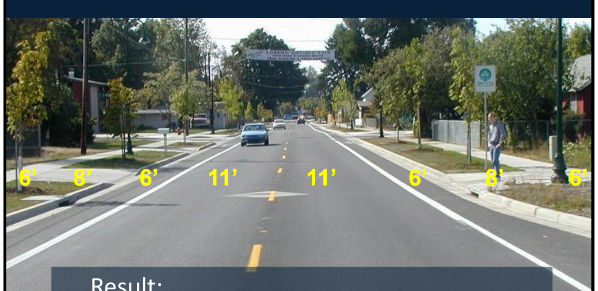
Graphic: Ian Lockwood

Don’t ask “How much do we need?”

Ask:

- How much do we have?
- What do we want?
- How do we design it to fit?

New approach: from the land use in



Result:
Context-appropriate. Sidewalks, bike lanes, & adequate travel lanes

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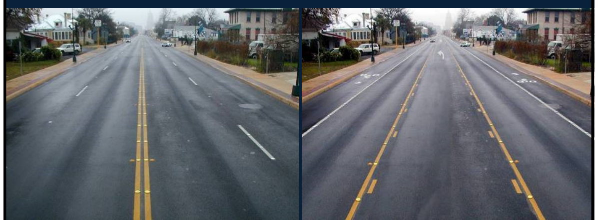
Constrained corridor? Rightsize it!



Convert 4-lane to 2 lanes, TWLTL, & bike lanes

29% crash reduction for ALL users

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FHWA proven safety countermeasure

"Road diets can be low cost if planned in conjunction with reconstruction or simple overlay projects, since a road diet mostly consists of restriping. Roadways with Average Daily Traffic (ADT) of 20,000 or less may be good candidates for a road diet and should be evaluated for feasibility."

Rightsizing tool: Narrower travel lanes

Ten feet should be the default width for general purpose lanes at speeds of 45 mph or less.

ITE Traffic Engineering Handbook, 7th Edition


Rightsizing tool: Curb extensions
STOP
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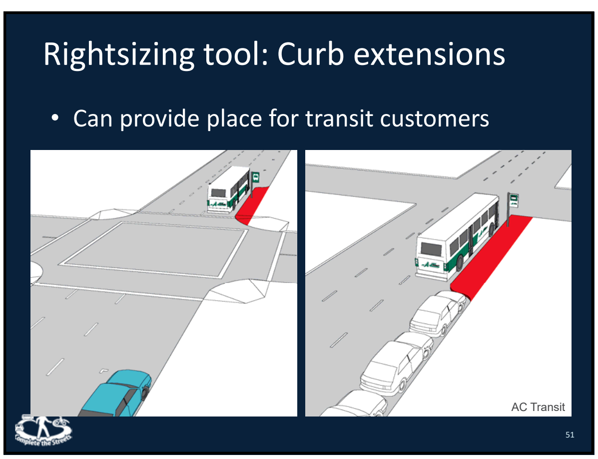
Rightsizing tool: Curb extensions
• Can help manage stormwater


Rightsizing tool: Curb extensions
• Can provide place for transit customers
AC Transit
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Rightsizing tool: Curb extensions
• Quick, cheap, meaningful change
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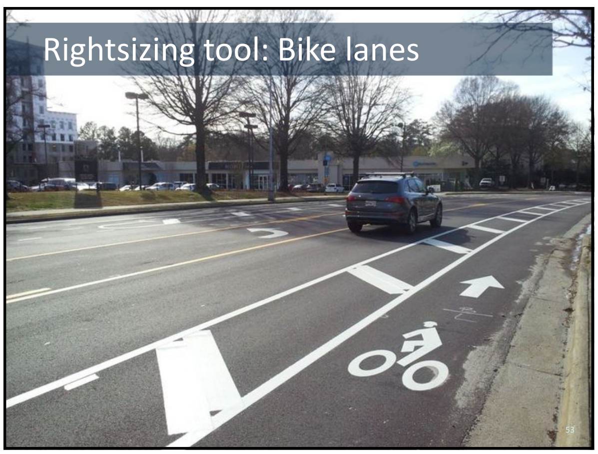
Rightsizing tool: Bike lanes
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Rightsizing tool: Transit islands
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Rightsizing tool: Parking

Rightsizing tool: Parklets and plantings

Rightsizing tool: Wider sidewalks

Rightsizing tool: Transit-only ROW

Capacity and delay

Defining mobility

Typical experience:
- 45 mph speed
- 2 min wait at signal

Viable alternative: 2-way progression set for 30 mph

Roundabout corridors

Golden, Colorado
- Four 2-lane roundabouts in a half mile
- Free-flow speeds reduced from 47 to 32 mph
- Reduced travel time end-to-end
- 40% fewer crashes

Defining mobility

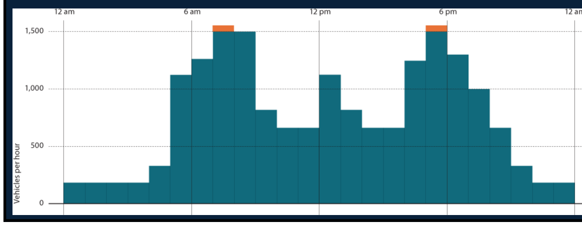
Signal progression for driving & bicycling

Defining mobility

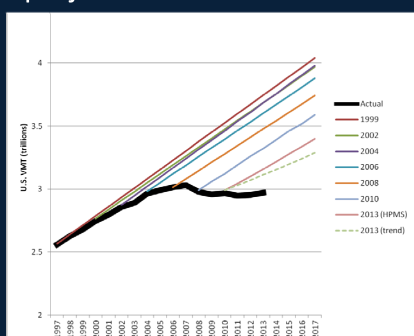
- With Complete Streets, volume and speed are outcomes—not inputs.
- Transportation is a means, not the ends
- Consider access to destinations as the goal
- Travel-time reliability more important to individuals

Peak hour

- Collect multi-modal data over 2-4 hours of peak traffic
- Use signal timing or TDM to shift congestion
- Use corridor-level performance measures rather than specific intersection peak LOS
- Look for solutions at the network level



VMT projections are overestimated



U.S. VMT (in trillions) as tracked by FHWA's Travel Volume Trends ("Actual") and as projected by U.S. DOT's C&P reports (by year reports are dated). Source: SSTI

The reality

A post-construction analysis of traffic on arterials and collectors in urban areas revealed traffic forecasts were **overestimated by a significant amount**

Pavithra Parthasarathi and David Levinson, "Post Construction Evaluation of Traffic Forecast Accuracy," Transport Policy (2010): 1–16.

Overestimated VMT

- Implies a level of “needed” spending that is unachievable
- Encourages overbuilding projects, which leads to fewer projects and more maintenance costs
- Discourages lower-cost, lower-throughput streets that benefit communities

Future trends are unknown

- Changing demographics and preferences
  - Two largest age groups—Millennials and Boomers—want better access and proximity
  - Coming soon: connected vehicles, expanded shared mobility opportunities
- Plan for *what you want* in your community

Intersection design

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Intersection principles

- Compact
- Self-evident
- Simple, right angles
- Access management
- Time for safety of all users

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Improving intersections, inexpensive:

Signal timing

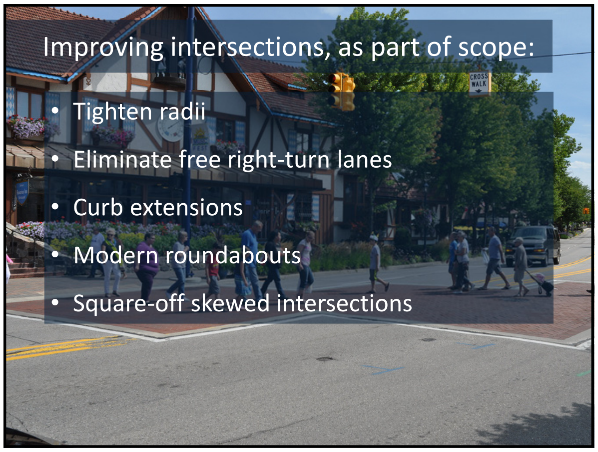
- Short cycles to function as network
- Reduce person delay
- Ensure enough time for people of all ages and abilities to cross
- Coordinated for low-speed travel
- Fixed-time signals where pedestrians are expected

Improving intersections, inexpensive:

- Signal timing
- Leading pedestrian intervals/Lagging lefts
- Countdown clocks
- HAWK & RRFBs and high visibility crosswalks
- Bike boxes, advance stop lines
- Banning turning movement in crash-prone areas or where walking is prioritized
- Use interim design strategies

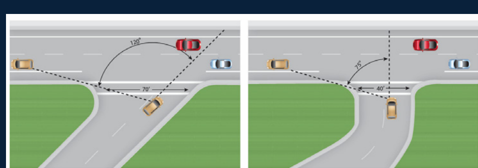
Improving intersections, as part of scope:

- Tighten radii
- Eliminate free right-turn lanes
- Curb extensions
- Modern roundabouts
- Square-off skewed intersections



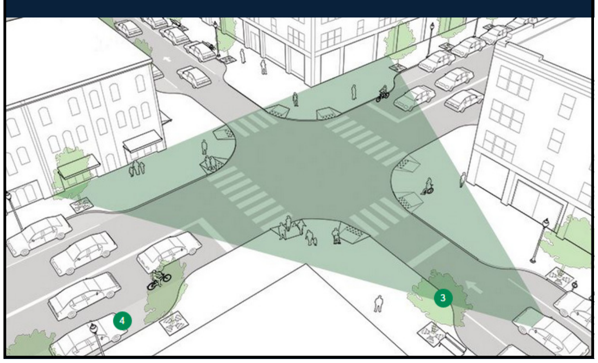
Square off skewed intersections

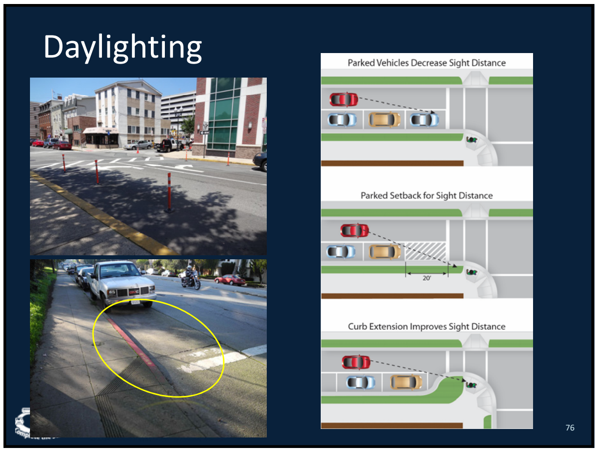
- Improve visibility, safety for drivers
- Reduce crossing distance for people walking



Model Design Manual for Living Streets, Michele Weisbart

Sight distance at intersections




Daylighting
Parked Vehicles Decrease Sight Distance
Parked Setback for Sight Distance
Curb Extension Improves Sight Distance
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Simple, low-cost, high-impact


Simple, low-cost, high-impact
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Design vehicle

Design or control vehicle?

Design or control vehicle?

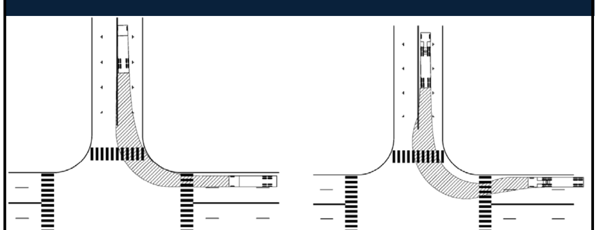
Control vehicle

- Less common vehicle
- Infrequent turns
- Accommodated, but encroachment and complex maneuvers allowed/expected

Design vehicle

- Common user, regularly accommodated
- Turns frequently with little encroachment
- Consider:
  - DL-23 for neighborhood streets
  - SU-30 for downtown/commercial
  - WB-50 for designated truck routes (using full intersection for turns)
  - BU-40 for designated transit routes with full-time bus service

Design or control vehicle?



The Design Vehicle, which makes the turn frequently, is accommodated within travel lanes.

The Control Vehicle, which makes the turn occasionally, is accommodated by infrequent encroachment into adjacent lanes.

Lessons:

- Accommodate safe travel for all users
  - But aim for comfortable, attractive routes for walking, bicycling, and transit
- Use an iterative design process
  - Re-evaluate assumptions and decisions
  - Document your choices
- Don't fear unique designs
- Don't fear piloting new designs

Exercise

What streets in your community could benefit from re-imagining?

Please type your response into the question box. You may include the name of your community if you like.

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Sign up for Part 3 at pawalkworks.com!

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